Arthaniti

(New Series)

Contents

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PRSP as a development paradigm:
A critique and the contours of an alternative

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Abstract

The Poverty Reduction Strategy Paper (PRSP) Approach adopted by the World Bank and the IMF was designed to ensure a more open dialogue on poverty reduction and encourage active participation by all groups in the development process It is inherently flawed in its attempt to dissociate the problem of poverty from the nature of the growth process Contours of an alternative genuinely pro-poor development strategy are outlined.

Keywords : PRSP, stabilization policy, legitimacy, alternative strategy

1. Introduction

The Poverty Reduction Strategy Paper (PRSP) Approach adopted by the World Bank and the IMF in 1999 requires poor countries eliciting or expecting to elicit financial support under the HIPC initiative, the soft-lending IDA facility of the World Bank or the IMF's Poverty Reduction and Growth Facility to prepare a strategy paper as the basis for such support. A World Bank document titled "Poverty Reduction Strategy Papers: A Renewed Approach for Reducing Poverty" dated 5 July 2001 declared: "PRSPs are a requirement for countries in order to receive concessional assistance from the World Bank (through the International Development Association – IDA) and the IMF (through the Poverty Reduction and Growth Facility – PRGF). In addition, they are the basis for the provision of debt relief under the enhanced HIPC initiative. It should also be noted that the World Bank's business plans for low-income countries – the Country Assistance Strategies (CAS) – will be based upon PRSPs from 2002. In the interim, the timing and sequencing of CASs relative to I-PRSPs and PRSPs will be decided on a case- by-case basis, but to the extent possible, CAS Updates and CASs will be timed to follow I-PRSPs and PRSPs. As a result of this new approach to IFI3 concessional assistance, PRSPs are currently on the agendas of about seventy low-income countries around the world."[1]

The origin of the PRSP approach can be traced to September 1997, immediately after the East Asian crises, when the Annual Meetings of the World Bank and the IMF were held in Hong Kong, China. In his address to that meeting, suitably titled "The Challenge of Inclusion", Wolfensohn argued that the challenge of development was that of bringing into society people who have never been parts of it before. "This is

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1 The document is available on the World Bank's website.

why the World Bank Group exists," he said. "This is why we are all here today. To help make it happen for people." (Wolfensohn 1997).

The core principles underlying the approach is that the strategy should be:

a. **country-driven and country-owned**, as a result of being formulated through a participatory process involving governments, civil society, and the private sector in all operational steps;

b. **comprehensive**, in the sense that it integrates macroeconomic, structural, sectoral and social elements;

c. **partnership-oriented**, involving coordinated participation of development partners (bilateral, multilateral, and non-governmental); and

d. based on a **long-term perspective** for poverty reduction.

Conditionality and Ownership

At the very outset it must be noted that the link between the provision of support either for development or for balance of payments purposes and the adoption of the PRSP approach implies that the consultation process that leads up to the PRSP is not completely a voluntary phenomenon. Further, inasmuch as many countries were in urgent need of support in the aftermath of the adoption of the approach by the Fund and the Bank, there was not much time to have genuinely broad-based and participatory consultations, even taking account of the fact that the Bank and the Fund provided for an Interim-PRSP as a first step in the completion of the process.[2] This pressure to go through with the PRSP process to access support could also have in some contexts served as a means by which governments avoided any genuinely participatory process of consultation. To provide for this possibility the document quoted above stated that: "In particular, with regard to the participatory process, it is recognized at the outset that there will be substantial variation with regard to the nature and extent of participation across PRSPs. As such there is no uniform minimum threshold; rather a commitment to openness and transparency is important." In fact it went on to rather candidly state that: "The challenges facing the PRSP approach include managing tensions that were recognized from the beginning as being inherent in the approach itself. The most important of these are the tension between quality and speed in preparing country strategies; and between country ownership on the one hand and Bank and IMF assessment of country strategies on the other." The real issue is whether these are just "tensions" that can be managed or deep-seated contradictions inherent in the approach.

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2   To deal with this difficulty the Fund and the Bank provided for an interim-PRSP or I-PRSP, which does not require the participatory process or the comprehensiveness of the PRSP. They also relaxed the condition that the final PRSP should be completed within a year of compilation of the I-PRSP.

For example, it is not clear why a poverty reduction strategy that can be truly classified as nationally owned would be necessarily acceptable to the IMF and the World Bank. But Bank-Fund acceptance is a necessary condition for a country's PRSP to be approved. As the July 2001 document made clear: "A **Joint Staff Assessment (JSA)** evaluates the soundness of each PRSP, and accompanies the PRSP to the Boards of Executive Directors of the World Bank and IMF.[3] This document is an assessment of whether or not the strategy presented in the PRSP constitutes a sound basis for concessional assistance and debt relief from the IFIs. Key questions are examined vis-à-vis the four core elements of a PRSP: (a) description of the country's participatory process; (b) poverty diagnostics; (c) priority public actions; and (d) targets, indicators, and monitoring systems. While every PRSP would be expected to provide an adequate overall treatment of each of these four areas, judgments in the JSAs are grounded in country conditions and its starting point rather than relative to an international norm." That is, the Fund and the Bank are the final arbiters of the soundness of a PRSP, even if it is claimed that prior, international norms are not to be the criteria for judging a strategy, especially the "priority public actions" that are central to it. After all, the adoption of the PRSP approach does not imply that loan-conditionality as a policy is being given up by the Fund and the Bank. In fact, in its recently approved "new" guidelines on conditionality (which were last revised in 1979) as well, the IMF has incorporated national ownership as a principle to be aspired for. That is, in the view of the Fund and the Bank, "ownership" and "conditionality" can go together.

However, inasmuch as conditionality requires the country concerned to adopt a set of development policies that the Fund and the Bank consider to be most appropriate, given its circumstances, there is an obvious contradiction between the notions of conditionality and ownership as the terms themselves suggest. The only circumstance when this need not be true is if there is consensus among the Fund, the Bank, the government and civil society, about what is the appropriate package of policies to be adopted by a particular country at a particular point in its history. Experience suggests that there is no such consensus.

Despite the lack of that consensus, governments have in the past adopted versions of Fund-Bank type neo-liberal policies because of the influence of the Bretton Woods institutions whose strength derives from their direct and indirect control over the flow of foreign finances. They directly exercise such control because the Fund and the

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3   The document described the JSA as follows : "The IFIs will focus on and assess those policies and programs in its area of responsibility Accordingly, World Bank staff will take the lead in assessing the necessary diagnostic work such as poverty assessments, the design of sectoral strategies, governance and institutional reform, and social safety nets. The IMF will focus upon its traditional mandate – macroeconomic policies. In areas where the World Bank and the IMF both have expertise such as fiscal management, budget execution, budget transparency and tax and customs administration, the two institutions will coordinate closely."

Bank themselves were and are important multilateral donors with substantial budgets. Their indirect control is explained by the influence that Fund-Bank perceptions of a country's strategy can have on the access of that country to private foreign financial resources.

Defining a strategy

To assess whether the exercise of these means of control over the PRSP leads to a strategy that, from a non-Bank, non-Fund perspective is not in the best interests of a country, we need to begin by defining what constitutes a strategy. Put briefly, a strategy must have three components: (i) it must identify preferred outcomes or specific targets in priority areas, that are to be realized within a specified time-frame; (ii) it must delineate the institutional structures, systemic mechanisms and policies that are the proximate constraints to or determinants of failure in realizing those outcomes; and (iii) it must lay down the policy initiatives that would reform those structures, mechanisms and policies, so as to ensure the success of the strategy.

This definition of a strategy also defines the requirements of a genuinely participatory process that leads to evolving such a strategy. It should be obvious that a truly participatory process would involve stakeholders in the determination of all three aspects of the strategy. However, the level of consciousness of wider social and economic processes required to ensure participation with regard to the three elements of the strategy vary substantially. Thus, at relatively lower levels of consciousness, consultations with the poor may only help identify the felt needs of the poor and therefore the priority areas and preferred outcomes in each. It may also help identify the proximate constraints to the realization of those outcomes. But moving on from there to delineating the systemic mechanisms and policy influences that lead to failure and identifying measures to modify them may be a difficult task.

This is a problem which need not be restricted to the poor in countries where a part of the problem is that literacy and education may not be adequately widespread. Inasmuch as the strategy under discussion here includes elements like a macroeconomic framework, there could be more influential stakeholders like some NGOs or civil society groups that may not have studied and thought through the full implications of alternative frameworks that do exist.

It is not that all those concerned cannot acquire such knowledge, but that most often it is in the course of acting to ensure change that this happens. That is, true participation is a long run process of mobilizing for change in the course of which voices are not just heard, but the consciousness need to make those views comprehensive is also developed. Mere consultations alone, therefore, do not guarantee true participation. They might merely lead to agreement on the broad contours of preferred outcomes in priority areas like poverty-reduction, education and health, rather

than on the "strategy" most appropriate to realizing those outcomes. Thus, the problem with the PRSP approach is not just that the process may be characterized by a narrow, inadequate and faulty process of consultation, but that even when consultations are relatively wide, they may not reflect true agreement on the appropriate policies for more egalitarian and sustainable development.

Not surprisingly, criticism of PRSPs does not relate merely to the extent of participation involved in the framing of the strategy, but that, finally, these strategy papers are merely a repackaged versions of conventional Bank-Fund stabilization and structural adjustment policies that have been known to be inimical to egalitarian and sustainable development.

PRSPs in practice

The evidence that PRSPs tend to incorporate the typical, discredited Bank-Fund "development" policies is substantial. Experience indicates that independent of the circumstances affecting the country concerned PRSPs have as their medium term goals the realization of some combination of the following: an open trade regime based on unilateral liberalization involving removal of quantitative restrictions and reduction of tariffs; a high degree of currency convertibility; the abolition or substantial curtailment of deficit financing based on strict limits on government spending, cuts in subsidies and imposition of user charges for provision of crucial public services such as water, sanitation and primary health services; incentives provided through the taxation route for private savings and investment; greater autonomy for the central bank and a greater reliance on monetary rather than fiscal measures in economic policy; a substantially liberalized financial sector; and removal or substantial dilution of any regulatory measures aimed at influencing private decisions with regard to investment, production and pricing. An early analysis of policies included in PRSPs in Africa point to the presence of such policies in all countries, irrespective of size and circumstance.

Closer home, in Asia, where the PRSP process was initiated slightly later, the experience has been no different. Thus the PRSP prepared in December 2002 in Bangladesh (Economic Relations Division, Ministry of Finance, Govt. of the People's Republic of Bangaldesh 2002) declares that in the effort to accelerate pro-poor growth: "the private sector will be the engine of economic growth". Hence, the government's role will be one where it : "will create an investment-friendly environment and act as a facilitator through pursuing policies to create a stable macro economy, improve law and order, promote good governance, maintain competitiveness, remove infrastructure bottlenecks, ensure cost-effective fiscal and financial services, and provide market information and support services." To this end, "the Government's priority would be to improve external and internal balances" by implementing comprehensive medium

term stabilization and reform measures. Under that program "fiscal measures would be taken to contain fiscal deficit; limit deficit financing and domestic borrowing; mobilize domestic resources (tax and non-tax) through better compliance (*not higher tax rates*), collect arrears, reduce exemptions, extend the VAT net, and improve tax and customs administration; rationalize pubic expenditure and ensure gender equality through improving quality, reducing subsidies to SOEs, implementing non-productive expenditure control measures, and improving procurement and financial accountability."

The task of improving external and internal balances is to be helped by a restrictive monetary policy as well. "The monetary and exchange rate policies would undertake a strict credit programme to reduce pressure on the foreign exchange market and, if necessary, the employment market based on instruments to achieve inflation and reserve objectives; and measures to move towards more flexible exchange rate management."

As we argue below fiscal austerity, stringent monetary policies and any devaluation associated with the use of the "more flexible exchange rate management" system to ensure external balance are all contractionary in nature. They have two effects: that of lowering the growth rate to ensure that imports under a more liberal regime do not exceed that which can be financed with the available foreign exchange; and that of limiting the maneuverability of the government in implementing pro-poor social and economic policies, given the limited resources available.

There are five ways in which the government hopes to deal with these problems: (i) in the short term, it expects to garner "once-for-all" resources from privatization, assuming that it can be successful, possibly to reduce the intensity of the expenditure cuts required to meet fiscal targets; (ii) it hopes to use micro-finance as a means to ensure availability of credit for "self-employment" that can enhance incomes and generate growth; (iii) it expects that inflows of foreign exchange through the remittances route would be sustained, so that a part of the deficit on the balance of trade can be neutralized and the current account deficit on the balance of payments can be reduced, for any given level of expenditures; (iv) it hopes to enhance revenues in areas like tourism to neutralize the loss in textile export revenues, when the quotas under the multi-fibre agreement are completely phased out in 2005, so as to limit the likely increase in the trade deficit; and (v) it hopes to obtain more foreign aid inflows after the PRSP is framed that would help finance a larger current account deficit as well as cover essential expenditures, especially social sector expenditures. In sum, the process of adjustment is sought to be made less painful by depending on once-for-all revenues from privatization, on the presumed stability and increase of exogenously driven and unstable flows from remittances, and on expectations of fortuitous increases in tourism revenues and foreign aid. Further, the strategy expects to meet the shock from fiscal

stringency and financial sector restructuring by relying on micro-finance schemes, despite evidence that the high interest rates associated with such schemes makes it difficult for them to finance productive investments and boost long-term employment opportunities.

In fact, central to the stabilization programme is "privatization or liquidation and reforms of the state-owned-enterprises (SOEs) to contain their demand on budgetary and bank resources". The programme goes further: it expects to generate resources in the short run to support the budget. Though only one SOE had been privatized and 8 others were in process at the time of finalization of the PRSP, the document states "100 SOEs have been decided to be privatized including 53 SOEs that have been earmarked for privatization in 2003".

It is obvious that this package includes policies typical of the structural adjustment programme conventionally recommended by the Bretton Woods institutions. Further, the route by which they were arrived at was also by no means participatory. According to Feisal Hussain, former Country Director, ActionAid Bangladesh, "The current process more or less excludes a range of groups whose active support and participation is critical if the PRSP is to generate the kind of outcomes as envisaged. While the Taskforce's activity plan outlines consultations with a number of groups, it is argued that such 'consultations' are seen by the Taskforce more as a technical requirement to legitimise the PRSP and thus access loans than as a genuine participatory process to define national economic and social priorities. There are reasons to support such an argument."

The situation is similar in other countries as well. Thus, in Vietnam, which completed its full PRSP process in May 2002, the objectives the paper seeks to achieve include:

   a. Continuing with structural reforms to bring about a transformation of the nation's economic structure; reorganize, renovate and improve the efficiency of state-owned enterprises (SOEs); restructure the state budget; reform the commercial banking system, reorganize and strengthen the health of financial and credit organizations; continue with trade liberalization, by honouring international commitments made under the framework of AFTA, making good preparations for the country's accession to the WTO, realizng bilateral trade agreements and so on, so as to raise the efficiency and competitiveness of the economy and meet the requirements for rapid growth and sustainable development.

   b. Continuing the open-door trade policy, gradually remove non-tariff barriers, and implement commitments under the ASEAN framework, the Vietnam - US bilateral trade agreement, and commitments made with international financial institutions. Improve the consistency of policies and link the trade, industrial

and exchange rate policies together, and at the same time, consolidate the policy coordination between concerned ministries and agencies. This is justified on the grounds that: "Implementation of international trade commitments in the process of international economic integration, while offering many important advantages, will expose domestic enterprises to challenges and fierce competition with foreign enterprises right in the domestic market."

c. Maintaining macroeconomic stability by adopting a prudent monetary and fiscal stance, improve the taxation policy, broaden the tax base, and ensure a close link between objectives and planned targets on the one hand and policies, mechanisms and budget on the other hand.

d. Creating an equal business environment for all types of enterprises from all economic sectors, including enterprises with foreign direct investment (FDI), with respect to their access to public services and business and investment opportunities, and encourage the development of small- and medium-sized enterprises.

Similarly, Cambodia's I-PRSP states: "Growth is the most powerful weapon in the fight for higher living standards. Faster growth will require policies that encourage macroeconomic stability, shift resources to more efficient sectors, and integrate with the global economy." This presumes that "policies that encourage macroeconomic stability" would not prove inimical from the point of view of growth; that if growth does occur, it would necessarily have trickle-down effects on poverty; and that integration with the global economy would necessarily result in efficient investment allocation and improved competitiveness, rather than deindustrialisation and unemployment. The experience with the structural adjustment programmes of the 1990s does in fact go contrary to all of these presumptions.

Finally, Sri Lanka's PRSP finalized in December 2002 makes the following statements:

There are three key elements in the Government's Program for Sri Lanka to regain control of our economic future. These include:

a. Accelerating the process of privatization of commercial activities so that they could be more productively undertaken by the private sector. This is underway.

b. Reforming the legal foundation of the economy. The process has begun and the government is introducing new legislation in many key economic areas.

c. Increasing substantially the efficiency in the critical government functions. For example efficiency in the areas of tax and custom procedures. Reduced trade and regulatory barriers will enhance competitiveness. To achieve this government

is in the process of introducing a world-class Revenue Authority. Soon many other government functions too will fall in line.

Anything that interferes with or distorts these decisions – including unwarranted government interference – will reduce productivity and thus reduce economic growth. Consider several recent examples of conditions that have hurt productivity in the Sri Lankan economy:

(i) The high electricity prices that are a result of past mismanagement of the power sector increase production costs and thus lower productivity. This has forced firms to make additional investments in generator capacity to cope with the frequent power outages in recent years Since electricity is an input into virtually all goods and services, these added costs have far reaching negative impacts on productivity.

(ii) Regulations restricting the diversification of crops, limitations on land ownership and the length of land leases, and constraints on foreign participation have all tended to reduce productivity in the plantation sector specifically and more generally the agricultural sector. These restrictions have impeded investments in more productive technologies, such as drip irrigation methods and improved seed varieties, and hindered the emergence of a competitive commercial agricultural sector.

(iii) Also in the agricultural sector, high import protection of some basic foodstuffs has fostered inefficient production and high prices. This has come at the expense of production of more profitable alternative crops. To make matters worse, in recent years the government has periodically opened the economy to large imports of basic foodstuffs that have led to large price fluctuations. This hurts farmers' abilities to produce efficiently. And finally, high prices for staple foods put upward pressures on wage rates, which hurt competitiveness throughout the economy.

(iv) Tax, trade and regulatory policies have reduced investment levels and led to distortions in investment patterns and reduced economic growth. These differential incentives have also increased costs in various ways and undermined competitiveness.

In each of these examples, attempts to provide incentives to encourage investment and stimulate economic growth has in fact led to lower productivity and undermined prospects for future growth.

In sum, the adoption of the PRSP approach by the IMF and the World Bank does not involve any rethink on the nature of the strategy they advocate, under their failed structural adjustment progrmmes. Rather, the emphasis is to change the manner in which these policies are introduced into developing countries, so as to ensure that

even when they have extremely adverse growth and distributional consequences and increase external vulnerability, they do not erode the legitimacy of the IMF and the World Bank. The PRSP process does not reflect a change in policy belief or intent, but a shift in the method through which such policies are put in place in developing countries. It is above all the reflection of a new search for legitimacy.

In practice, the Bank-Fund position enters the "poverty reduction strategy papers" through a three-step process. First, it is presumed that ensuring high and stable growth is a prerequisite for poverty reduction. Second, it is presumed that growth is predicated on maintaining a "stable macroeconomic environment" in the sense that the Bank understands it and establishing a climate conducive for private investment, especially private foreign investment, which is expected to be a lead factor in growth. Third, the set of policies prescribed to stimulate growth, is a package of "adjustment" measures involving external and internal liberalization of the real and financial sectors as well as privatization aimed at expanding the role and increasing the operational flexibility of the private sector. To ensure that these steps are adhered to, the Bank and the Fund require that the PRSP approach should be "comprehensive". As one World Bank document put it: "Since poverty is complex and multidimensional, the strategies should be comprehensive, and should include plans for rapid economic growth, sound macroeconomic policies, structural reforms, and social improvement."

Wolfensohn's *Challenge of Inclusion* speech had also specified the broad contours of the strategy to be adopted to deal with the problem of poverty. To quote: "How, then, do we proceed? This much we know: *No country has been successful in reducing poverty without sustained economic growth.* Those countries that have been most successful — including, most notably, many here in East Asia — have also invested heavily in their people, have put in place the right policy fundamentals, and have not discriminated against their rural sectors. The results have been dramatic: large private capital inflows, rapid growth, and substantial poverty reduction. The message for countries is clear: Educate your people; ensure their health; give them voice and justice, financial systems that work, and sound economic policies, and they will respond, and they will save, and they will attract the investment, both domestic and foreign, that is needed to raise living standards and fuel development." The sequence here must be noted: Put in place the "right policy fundamentals", encourage financial flows, and do away with discrimination against the rural sector (which past experience with World Bank research and policy advice suggests is ensured by reducing protection for industry), and expect private capital inflows from abroad to help trigger growth and ensure poverty reduction. With such a strategy it would be appropriate to restrict the state to human resource development and social sector expenditures.

The most obvious problem with this argument is that despite the wave of liberalisation of regulations governing trade and capital flows into developing countries,

only a few of those countries receive such flows. According to the UNCTAD's World Investment Report 2002, as in the past, FDI flows to the developing world remain unevenly distributed. In 2001, the 49 Least Developed Countries (LDCs) remained marginal recipients, with only 2 per cent of all FDI to developing countries or 0.5 per cent of the global total. The five largest recipients attracted 62 per cent of the total inflows to developing countries. In terms of regions, Africa remained a marginal recipient of FDI with a substantial concentration of the flows to South Africa and Morocco. Further the FDI flows to Africa have been narrowly concentrated in the primary sector. On the other hand, the share of the Asia-Pacific region in world inflows increased from 9 per cent in 2000 to nearly 14 per cent in 2001. China regained its position as the largest recipient in the Asia-Pacific region as well as in the developing world as a whole, replacing Hong Kong, China. India, Kazakhstan, Singapore and Turkey were significant recipients in their respective sub-regions. With the effects of the late 1990s financial crisis still to wear off, the Association of South-East Asian nations saw a fall in FDI levels in recent years to about one-third of the peak in 1996-97.

The problems of uneven access and inadequate access for most countries relates not just to FDI. The concentration of capital market flows is somewhat higher than FDI; the top 10 recipients accounted for 75 percent of total flows. Even developing countries that received significant amounts of FDI often received almost no portfolio flows.

Even while capital inflows are not likely in many developing countries they are forced to liberalise financial markets and make the fiscal and structural adjustments needed to make their economies attractive to foreign investment. The point is when this policy does not work the failure is attributed to factors that are unlikely to disappear in market-driven economies. To quote Wolfensohn once again: "We have seen in recent months how financial markets are demanding more information disclosure, and how they are making swift judgments about the quality and sustainability of government policies based on that information. We have seen that without sound o ˌganization and supervision a financial system can falter, with the poor hurt the most. We have seen how corruption flourishes in the dark, how it prevents growth and social equity, and how it creates the basis for social and political instability. We must recognize this link between good economic performance and open governance. Irrespective of political systems, public decisions must be brought right out into the sunshine of public scrutiny. Not simply to please the markets but to build the broad social consensus without which even the best-conceived economic strategies will ultimately fail."

Recent experience has made clear that no market-driven economy, developed or developing, is free of "governance" problems, in both the public and private sectors. Corruption scandals are common in Europe and Japan, besides the developing countries.

And even the US, which was held up as the icon of transparency and proper regulation has been rocked by widespread discovery of accounting scandals, auditing irregularities, market manipulation and poor supervision. If much less severe versions of these features are made the explanations for the failure of any individual developing country to attract capital, and liberalization is offered as the panacea, there can be no end to the process. The failure of any dose of liberalization to deliver the "expected" results is attributed to corruption, cronyism or inadequate reform, necessitating more liberalization. And if that doesn't work, there would still be no shortage of anecdotes about corruption and cronyism to keep the process going.

Given the observed failure of Bank-Fund type development strategies to ensure large capital inflows that may or may not inject a modicum of dynamism into otherwise sluggish economies, the question that remains relates to the internal features of these strategies that militate against the realization of commonly specified goals.

PRSP Strategy defined

Bank-Fund policies and the problem of deflation

The problem on the ground is that while for most developing countries, large capital inflows to finance investment and growth are not an option, the policies recommended by the World Bank and the IMF to attract such flows, being deflationary in nature, actually work to reduce the rate of growth of the system. Conventionally, when the Bank and the Fund act in tandem, as they normally tend to do, there is a well-specified division of labour. The fund is concerned with ensuring the adoption of appropriate "macroeconomic policies", while the Bank takes the responsibility for "sectoral strategies", which include policies aimed at reducing poverty and improving welfare. These sectoral strategies are expected to ensure economic buoyancy in the medium term while advancing human development.

Central to the IMF's macroeconomic framework is the argument that any inflationary tendency or tendency to "overheating" in an economy, resulting from excessive consumption and/or investment expenditures by the public and/or private sector must not be suppressed and prevented from spilling over onto the balance of payments. From the system of national income accounting we know that the identity that *the excess of private investment over private savings plus the excess of the government's expenditures over its (tax and non-tax) revenues equals the current account-deficit-on the balance of payments* must hold by definition. If, therefore, the government imposes severe import controls to prevent the trade and current account deficits from widening, and if investment and government expenditure exceed the sum of private savings and the government's revenues, prices must rise domestically to generate the "forced savings" needed to ensure that the identity holds. The IMF's argument is that rather than suppressing the balance of payments weakness inherent

in the situation, the government should allow the excess absorption to show itself in terms of an unsustainable current account deficit, which cannot be financed, and meet the problem with spending cuts that helps restore an equilibrium without inflation. In sum, a reduction in growth rates through government spending cuts is seen as the mechanism through which the rate of expansion of an economy should be adjusted to its ability to earn or acquire foreign exchange. This is why fiscal austerity, aimed at closing the gap between government expenditures and revenues, even to the extent of generating a budgetary surplus, is at the core of IMF-type stabilization programmes.

There is one major problem with this particular, unimodal ·eading of the mechanisms underlying the maladjustment that needs to be rectified with fiscal austerity. It is well known that poor countries are also most often characterized by a high degree of income inequality, which implies that there is a small upper-income group section that desires and is capable of purchasing a range of imported or import-intensive commodities. When trade is liberalized, therefore, the release of the pent-up demand for importables among the richer sections is bound to increase the import bill. On the other hand, exports are unlikely to rise immediately because the restructuring need to generate enterprises that are competitive in export markets would take time and, in any case, export demand requires building "goodwill" in international markets, and goodwill is a function of time. Hence, trade liberalization, aimed at improving competitiveness, most often results in a relatively small or no increase in exports, while it results in a surge in imports due to the release of the pent-up demand for importables among the rich. In fact, even in the medium-term, exports are likely to prove more "sticky" than imports, resulting in a persisting deficit of large magnitude in the current account of the balance of payments.

In terms of the macroeconomic identity discussed above, liberalization results in increased private consumption expenditure and a fall in private savings, leading to an increase in the gap between private savings and investment. This has to be covered by a lower deficit or even a surplus in the government's budget.

In the IMF's view, maintaining an open economy would also impact positively on international investor sentiment resulting in capital flows that help a country finance a much larger current account deficit than would earlier have been the case. That is, autonomous capital flows are expected to reduce the extent of deflation or contraction of the system needed to avoid balance of payments difficulties. But as has been argued earlier, experience indicates that even with liberalization least-developed countries that are required to adopt the PRSP approach are not considered safe homes for their wealth by international investors. As a result, they receive little or no foreign direct or portfolio investment.

To the extent that the increase in the current account deficit due to liberalization is not financed by autonomous capital inflows, the country concerned would face a

balance of payments problem, necessitating spending cuts by the government or a deflationary fiscal stance. Needless to say, while the balance of payments problem is the result of the profligacy of the rich, the effects of the deflation would be more widespread. In fact, since the "soft" social sectors are likely to bear the brunt of the cuts, the effects on the poor would be greater, since they would not only lose out in terms of employment opportunities but also through cuts in the social sector support they have thus far received.

Normally, when IMF-style stabilization is imposed upon or "owned" and adopted by a country, it is accompanied with World Bank-style structural adjustment with an ostensible focus on sectoral strategies. That focus is claimed helps improve the competitiveness of domestic suppliers in international markets, leading to larger export revenues and higher growth. It is also seen as helping create a social safety net that ameliorates any adverse consequences of macroeconomic stabilisation on social sector provision. However, many, if not most, Bank-inspired adjustment strategies are also contractionary in nature and often lead to stagflation or a combination of low growth and inflation. As mentioned earlier the typical Bank-style adjustment strategies involves the following: an open trade regime based on unilateral liberalization involving removal of quantitative restrictions and reduction of tariffs; a liberalized exchange rate regime and a high degree of currency convertibility; improved government revenue generation ensured through cuts in subsidies and imposition of user charges for provision of crucial public services such as water, sanitation and primary health services; incentives provided through the taxation route for private savings and investment; a substantially liberalized financial sector; and removal or substantial dilution of any regulatory measures aimed at influencing private decisions with regard to investment, production and pricing.

The sources of deflation in this strategy are many:

a. Import liberalization, which occurs principally in the manufacturing area, displaces domestic production of import substitutes.

b. A devaluation of the currency, which is encouraged in order to increase exports and reduce imports, also is deflationary if it is to work. This is because, prices of imported goods rise in proportion with the devaluation. If wages and commodities into which these goods enter rise *pari passu* then, despite the devaluation, the dollar value of exports would remain the same, since domestic prices would have risen by just that amount needed to neutralize the effects of devaluation. This means that wages and the prices of domestically produced inputs and commodities cannot rise in tune with import prices, implying a squeeze in real incomes for workers and domestic producers of primary inputs. The consequence is deflation.

c. Finally, in most instances, IMF-Bank policies are directly deflationary since the "sound macroeconomic policies" they recommend include the prescription that any deficit on the government's budget should either be substantially reduced or be transformed to a surplus. This is insisted upon even in circumstances where there is evidence of unutilized capacity and any major supply bottlenecks are absent. Such fiscal stabilization occurs along with liberalization-driven reductions in customs duties and the provision of tax concessions to private savers and investors that result in a squeeze on the tax-GDP ratio. The fall in the tax-GDP ratio means that any given level of the fiscal deficit-to-GDP ratio implies a smaller fiscal stimulus. If in addition, the fiscal deficit-to-GDP ratio is reduced, the extent of deflation is even larger. In addition, since public sector restructuring through closure or privatization is more often than not accompanied by an initial loss of employment, the demand constricting effects of these policies are indeed substantial. All of this slows growth, making it impossible to realize the Bank-Fund promise that appropriate policies would lead to growth and, therefore, to poverty reduction.

Further, Bank-Fund style stabilization and adjustment policies can work directly to worsen poverty and increase deprivation. Deflation increases unemployment. Reduction in subsidies on food tied to fiscal adjustment increases the prices of food and affects real incomes. Increases in user charges for a range of physical and infrastructural services squeezes real incomes. And reduced expenditures on social services varying from water and sanitation to health and education can worsen an already poor quality of life. In sum, it is not just that Fund-Bank policies reduce growth and therefore affect the poverty-reduction effort, but in various ways they contribute directly to an increase in poverty and deprivation.

There are also other indirect ways in which the package can result in slow growth, rising unemployment and increased deprivation. For example, the adoption of a liberalization package by a country dependent on primary product exports can result in its facing a decline in the prices of its principal exports, because that country and its competitors who are similarly liberalizing, would be increasing supplies to the world market to earn the foreign exchange to finance their imports. This could affect farmers' incomes adversely. It could erode the government's tax revenues. And, by worsening the current account of the country's balance of payments it could force both a devaluation of the currency and a cut back in government expenditures aimed at reducing domestic absorption and curtailing imports. All of these are deflationary in character and would inevitably result in slow growth and increased unemployment.

The effect of such slow growth and unemployment on large number of the poor can only be such as to increase the incidence of poverty or prevent the little growth that occurs from impacting favourably on poverty alleviation. It is not just through

slow growth and increased unemployment or underemployment that poverty can be worsened. We must recall that the Fund-Bank's concern for poverty does not lead to any argument in favour of an egalitarian redistribution of assets or land. It expresses itself in the argument that as a result of protection, the domestic inter-sectoral terms of trade tend to be more unfavourable for agriculture *vis-à-vis* industry than the terms of trade prevailing in the world market, so that removing trade restrictions and thereby preventing state-sponsored industrialization would benefit the agricultural sector which is the repository of mass poverty.

This argument is backed up by another that, since the inequality in urban income distribution was larger than that in rural income distribution, a shift in incomes from the urban to the rural sector, which means in effect from industry to agriculture, would have the effect of lowering overall income inequalities. The problem with this argument lies, *inter alia*, in the fact that in most developing countries a large proportion of the agriculture-dependent population consists of landless labourers and poor peasants supplementing their incomes through wage-labour, who are net buyers of foodgrains in the market. Since a part of the mechanism for a terms of trade shift in favour of agriculture would be an increase in agricultural prices, this increase would be relative to their money incomes as well. The rural poor in other words would actually be harmed by a rise in food prices, which is espoused by the Bank in the name of poverty reduction.

Above all, some of the medium term effects of the Fund-Bank strategy can be extremely adverse from the point of view of reducing poverty and improving welfare. For example, it is known that agricultural liberalization by encouraging a shift away from production of staple food crops to exportable cash crops, has had devastating consequences for food security in much of Africa. And the already vulnerable situation there is worsened by policies such as those adopted recently in Malawi where food stocks were sold in order to improve the budgetary position of the government, ostensibly with encouragement from even if not under pressure from the IMF.

Put together, these problems with the typical Fund-Bank strategy imply that it fails to deliver on the growth, poverty and welfare fronts. It is for this reason that these policies have been under attack. Yet, the "rethinking" underway in the IMF and the World Bank circles, which supposedly explains the Comprehensive Development Framework, the PRSP approach and the new guidelines on conditionality, has not involved any major rethink on the growth strategy itself.

If this be the case, what accounts for the new rhetoric with its emphasis on poverty, participation, partnership and ownership? Experience suggests that the new rhetoric merely reflects a desperate search for legitimacy on the part of the IMF and the World Bank.

The Need for Legitimacy

The need for legitimacy stems from two sources. First, the changed international environment. With more than two decades having elapsed after the collapse of the socialist republics resulted in skepticism about planning and state intervention, the ideological wave in favour of the market as against the planning principle has indeed weakened. Second, during those years IMF-Bank style structural adjustment strategies have been widely experimented with and the results show that they render developing countries vulnerable to slow growth and periodic crises. That lesson has been driven home with much force by the periodic financial crises that have occurred after the shocking collapse of the East Asian miracle countries in 1997. These factors together with the disappointment with the present form of corporate-led globalization, which is seen as deflationary and inequalizing, have helped foster a strong anti-globalization movement, which has among its principal targets the IMF and the World Bank.

The influence of these factors is visible from the history of the migration to the PRSP process. By the late 1990s the greater public scrutiny and debate over the disastrous consequences of pre-crisis IMF-style liberalization and actual post-crisis IMF policies in East Asia, resulted in a situation where the Bank and the Fund could no longer ignore the fact that the adjustment strategy they recommend had been a massive failure, from the point of view of reducing deprivation and stimulating growth, in Africa, Latin America and South Asia.

Faced with these challenges to their legitimacy, it now appears, the IMF and the World Bank decided to absolve themselves of authorship both for economic policy packages they typically recommend and for the specific form in which those polices are sought to be implemented in individual countries seeking their support. This is being sought to be achieved by getting governments to declare that these types of policies are the best to adopt in the circumstances their countries are in, and claim ownership by requiring these governments to build consensus around these policies through consultations with different segments of civil society.

An early sign that the IMF was "responding" to criticism in this form was the decision at the World Bank-IMF meetings in September 1999 to rename the Enhanced Structural Adjustment Facility as the "Poverty Reduction and Growth Facility" and its promise to learn from the World Bank in making the elimination of poverty the "centerpiece" of its programmes. But, as Walden Bello argued, "this was too little, too late, and too incredible", because, "support for the IMF in Washington was down to the US Treasury. Indeed, so starved of legitimacy and support was the Fund at the end of the 20th century that US Treasury Secretary Larry Summers, who in an earlier incarnation as chief economist of the World Bank had been one of the chief backers of structural adjustment, found that he could only save it by damning it. The IMF, he told

Congress, deserved to be preserved as a part of the international financial architecture, but when it came to dealing with developing countries, Washington would support "a new framework for providing international assistance.. one that moves beyond a closed, IMF-centered process that has too often focused on narrow macroeconomic objectives at the expense of broader human development.""

Finally, it was the World Bank which took the lead in responding to this loss of legitimacy, by engaging in a major public relations exercise aimed at changing the image of the Bretton Woods institutions. Barely two-and-a-half years after he assumed office in 1996 as President of the World Bank, James Wolfensohn had to confront the reality that policies adopted during the 1990s, especially the liberalization of their financial sectors, had resulted in financial crises in the miracle growth countries of East Asia, especially South Korea, Thailand and Indonesia. Moreover, in time it was becoming clear that the conventional policy package recommended by the World Bank and the IMF as part of their rescue mission, which had at its core an effort at "stabilization" through fiscal contraction, was not working in these countries, forcing a retraction. Finally, financial crises were becoming the norm, afflicting countries as diverse as Mexico, Brazil, Russia, Turkey and Argentina, all of which had in common the adoption of policies strongly advocated by the Bretton Woods institutions of opening up or keeping open their financial sectors. Quite significantly, experiences like those in Argentina proved that with an open financial regime, even countries that closely followed policies lauded by the Bretton Woods institutions were not immune to crisis, but in fact were increasingly crisis-prone.

The Rhetoric

It was during the years marked by these developments that the World Bank and the IMF chose to expand their agenda in search of legitimacy. To quote Bello again: "The Bank under Wolfensohn opened up channels of communication with willing sections of civil society and sought and won endorsements from respected academics and social persona. With the help of a well-oiled public relations machine, Wolfensohn tried to recast the Bank's image as an institution that was not only moving away from structural adjustment but was also making poverty-elimination its central mission, promoting good governance, and supporting environmentally-sensitive lending. The strategy was one in which the defence against growing criticism was to expand, in rhetoric at least, the agency's agenda."

The problem, argued Wolfensohn, was that: "In too many countries, the poorest 10 percent of the population have less than 1 percent of the income, while the richest 20 percent enjoys over half. In too many countries, girls are still only half as likely as boys to go to school. In too many countries, children are impaired from birth because of malnutrition, inadequate health care, and little or no access to early childhood

development programs. In too many countries, ethnic minorities face discrimination and fear for their lives at the hands of ethnic majorities. What we are seeing in the world today is the tragedy of exclusion."

The task of the international community was then defined. In Wolfensohn's words: "Our goal must be to reduce these disparities across and within countries, to bring more and more people into the economic mainstream, to promote equitable access to the benefits of development regardless of nationality, race, or gender. This — *the Challenge of Inclusion* — is the key development challenge of our time."

The problem was not that of the poor alone. "One does not have to spend long in Bosnia or Gaza or the Lakes District in Africa to know that without economic hope we will not have peace. Without equity we will not have global stability. Without a better sense of social justice our cities will not be safe and our societies will not be stable. Without inclusion, too many of us will be condemned to live separate, armed, and frightened lives."

On "Consensus" and "Partnership"

It was the growing evidence of such failure, even among countries that faithfully implemented Fund-Bank policies that created the legitimacy crisis that we spoke of earlier. And it was in response to that legitimacy crisis, that the "inclusion" rhetoric, which led up to the World Bank's Comprehensive Development Framework and the PRSP process, was adopted. In the Challenge of Inclusion speech itself, World Bank President Wolfensohn made clear that his intention was to transform the Bank-Fund agenda into a *consensus* that would be implemented *in partnership*.

Declaring that partnership is crucial to meet the challenge, Wolfensohn spelt out the "four pillars" on which it must rest:

a. The government and the people of developing countries must be in the driver's seat — exercising choice and setting their own objectives for themselves. Development cannot be donor-driven. This is not to say that the development community cannot play a role to help countries — it can provide financing; even more important, it can provide the knowledge and lessons learned about the challenges and how to address them. That is, it can be the fountainhead of ideas.

b. Partnerships must be inclusive — involving bilaterals and multilaterals, the United Nations, the European Union, regional organizations, the World Trade Organization, labor organizations, NGOs, foundations, and the private sector. With each playing to their respective strengths, it is expected that the entire development effort would be leveraged up.

c. Third, while the development community should offer assistance to all countries in need, it must be selective in the use of resources. It is necessary to use resources

"effectively", as a lever to enforce policies which are "good". Hence assistance must be concentrated on countries with good policies. Since their own perceptions of "effectiveness" and "goodness" are the ones that would matter to donors, who hold the levers of finance, it should be obvious that programme choices would be donor-driven, going against the first of the partnership principles. Wolfensohn, however, ignores this.

d. Finally, in his view, the development community must look to its 'strategies anew. What is needed is a quantum leap that will allow it to make a real dent in poverty. They need to scale up, to think beyond individual donor-financed projects to larger country-led national strategies and beyond that to regional strategies and systemic reform. In sum, the actual "change" in strategy was left vague and ambiguous.

Towards "Ownership"

The "legitimizing role" of the partnership notion needs to be emphasized. The World Bank's May 1998 Discussion Paper titled "Partnership for development: Proposed actions for the World Bank" made clear that the partnership agenda had as its principal goal that of ensuring developing country ownership over its development strategy. As part of that agenda the Bank wanted to work out a strategy "with developing country governments and official development institutions, a new approach to development assistance which convenes all major stakeholders around the country's development strategy, programmes and projects."

The Bretton Woods institutions had realized quite early the problems involved in ensuring "ownership". A 1998 IMF External Evaluation of the Enhanced Structural Adjustment Facility (Report No. EBAP/98/8) declared that the challenge was to find ways "to foster strong country ownership, and at the same time provide adequate assurances to both multilateral and bilateral sources of financial assistance that their resources will not be wasted." At least in principle the BWIs argued that "the solution lies not in limiting ownership to borrower countries' adoption of what donor's want, but in finding ways to enable recipients to develop and build consensus behind programmes capable of achieving sustainable growth." This was just a way of brushing the problem under the carpet, because it is being presumed that there is agreement on which programmes are capable of achieving sustainable growth. It is the lack of such agreement rather than the lack of knowledge regarding any single set of policies that explains the lack of consensus that leads up to programmes being donor driven.

The second aspect of partnership is coordination among donors. The proliferation of donors, programmes and projects, it is argued, puts a heavy burden on the limited managerial expertise of developing country governments. Further, the "collection of aid activities of a variety of donors in a particular country may not be adding up to a

coherent contribution to development." The problem with this argument is that it presumes that developing country governments do not have the capacity to manage their own agenda. If they did, the multiplicity of projects in an area can be dovetailed into an overall plan that the government/country owns. Further, inasmuch as there are "competing" donors, the ability of a government to hold to its own agenda would be substantially greater. Allowing donors to coordinate could result in a situation where donor- or developed-country preferences have an undue influence on the developing countries' policy regime. Partnership can effectively be the partnership of donors in imposing these preferences, as has been the case in many contexts. It is not that the World Bank is not aware of this. The partnership document of 1998 listed among the challenges likely to be faced by its approach the following:

> a. "Governments may be wary of an approach that brings stakeholders closer together, out of concern that it could lead to stronger pressures from the donor community especially with respect to reform. This is the concern about "ganging up."

> b. Governments may wish to maintain the freedom to play one donor off against another, to influence which donor does what, to introduce an element of competition in lending terms, and greater choices across donors."

The Partnership for Development Strategy

Based on these perceptions the World Bank's 1998 paper proposed a strategy constructed with the following five "building blocks:

> a. First, the consultative processes within the country (possibly at the national and subnational levels), between the government, private sector, civil society and aid agencies must be enhanced. To the extent that these are happening already, they should be supported and to the extent that such fora need to be created, donors must support the government in doing so. These consultations would yield a national development strategy, broadly owned by the country.

> b. Second, these processes need to culminate in an overarching meeting (or set of meetings) at which donors' assistance strategy, in support of the national development strategy, is debated and discussed— the meeting of the DPC. It is vital that private sector and civil society play a full part in this meeting.

> c. Third, the bulk of these consultation processes, and the final meeting, should take place in-country, to allow greater representation of government officials, private sector and the civil society, as well as fuller press coverage. The country has to have the sense that this is its process, not one driven by outsiders.

> d. Fourth, donors and development institutions will need to recognize the primacy of the country's strategy, and adjust their roles and actions accordingly. They

should move to a situation whereby the national development strategy presented by the government at the meeting of the Coalition becomes the guiding light for each actor's actions, even though ultimately they will have to draw up separate action plans for their own constituencies.

e. Fifth, agreements on Partnership Frameworks between development actors which recognize comparative advantages at the country level and develop a set of modus operandi for efficient collaboration will help in providing more effective support to the country's development strategy, and in realigning patterns of assistance as circumstances change.

The Implications of "Selectivity"

Dwelling on the implications of adopting this strategy the PFD declared: "Adoption of the proposed approach will undoubtedly transform the nature of the relationship between the development community and most countries, increasing effectiveness of development assistance, and the efficiency of the support it provides. It may also result in a slowing of the external financial assistance to some countries, at least in the short run, while increasing the support to capacity-building, and non-lending services. In other words, intrinsic to the approach is the notion of selectivity—thereby bringing to the fore an issue which the Bank is already committed to address."

One aspect of selectivity relates to the willingness of the country to formulate a strategy that incorporates a policy framework appropriate to render generalized financial support effective. According to the World Bank: "There is also a broad consensus on certain key elements of this framework— in particular, macroeconomic stability, exchange rate policy, efficient public expenditure oriented toward social investment. An immediate implication of this is that the allocation of financial support by the international community should reflect the adoption of this policy framework."

Enforcing selectivity requires agreement among donors and a willingness on the part of some donors to play a limited role in phases when financing is restricted to certain activities such as capacity or institution building. The real aim of the partnership agenda is to forge this "consensus" which developing countries would then be forced to own. Working towards the consensus is required because individual donors may feel sidelined and because "there are indeed development issues (e.g., financial sector reform) where consensus (even among donors) is not strong, and further dialogue and discussion are needed."

The Comprehensive Development Framework

The evolution of consensus is expected to occur at the stage of undertaking preparatory analytical work. "Donor collaboration in preparatory analytical work working closely with the government and, where appropriate, with other stakeholders

in the country is central to the implementation of the strategy proposed in this paper. Such collaboration would provide a unique opportunity for strengthening country ownership." This was clearly the beginning of the migration to the PRSP approach adopted for poor countries, wherein the preexisting role of the BWIs was to be strengthened through donor collaboration., but legitimized by focusing on country ownership and poverty alleviation.

As the first step in that migration, Wolfensohn advocated in January 1999 the adoption of what he called the Comprehensive Development Framework. This amounted to adopting what he termed a "holistic framework" in which as a counterpart to the macroeconomic framework involving stabilization of the kind "overseen" by the IMF (and captured in Article IV reports of the IMF, the National Income Accounts, the Balance of Payments and Trade Statistics, and all the other financial and economic analysis which are at the core of the BWI's appraisal system) there must be another side to the 'balance sheet', or perhaps better, the coin, which presents the "structural, social and human aspects".

Wolfensohn listed 14 "boxes" (including one empty box to accommodate country-specific programmes or policies). Some were mundane, such as good and clean government; and an effective legal system. Others were the typical areas of interest from a human development point of view: more education, including universal primary education; health and population programmes; water and sewerage; and environmental-friendly policies. Yet others, like social safety nets, indicated recognition of the destabilizing effects that a Fund-Bank type transition in policy regime could involve. The remaining boxes were concerned with defining the "strategies" that would deliver the kind of transition favoured by the Fund and the Bank. Principal among these were appropriate financial sector policies in the form of an effective and properly supervised and, most importantly, open (to foreign players) financial sector. Another was the need to ensure infrastructure development in areas like energy and roads, transport and telecommunications, with the help of private sector investment. These he argued needed to be combined with specific strategies for the rural and urban sectors, which is completely non-controversial. The question is what the nature of those strategies should be. An inkling of that is obtained from the fact that one of the boxes had been earmarked for a specific strategy for the private sector. The thrust of that strategy was unambiguously defined by Wolfensohn: "It is clear that the engine of growth is the private sector, both domestic and foreign. A vibrant private sector requires that crucial elements of structural policy are in place. These include trade policy, tax policies, competition and regulatory policy, and corporate governance. ... Conditions must be created for a climate of investor confidence – with appropriate laws, transparent regulations, and predictable taxes. Whether the issue is protection of property rights or fair and equitable labor practices, governments must give certainty to the investor

about the 'rules of the game'. Provision of credit, guarantees, sources of funding for projects all play a part in the competitive search by governments for investment and for job creation. Nothing is more significant to economic growth than the private sector."

Cleared of the ambiguity created by Wolfensohn's "hold-all" approach in the comprehensive development framework speech, the overall nature of the strategy is clear. First, IMF type stabilization and macroeconomic management is a given. Second, the typical adjustment strategy advocated by the Bank, and elaborated earlier in the paper, is to be pursued. Third, this is to be combined with substantial propaganda emphasis on human development and poverty alleviation, which is to be recommended as the area into which the state should "retreat" by consciously restructuring institutions and the legal system to accommodate a larger, unfettered and under-regulated role for the private sector.

To quote the World Bank: "The PRSP will, in effect, translate the Bank's Comprehensive Development Framework (CDF) principles into practical plans for action. The PRSP's aim is clear: to strengthen country ownership of poverty reduction strategies; to broaden the representation of civil society—particularly the poor themselves—in the design of such strategies; to improve coordination among development partners; and to focus the analytical, advisory, and financial resources of the international community on achieving results in reducing poverty."[4]

This persistence with the "old strategy" while dressing it in a new rhetoric, was obviously aimed at winning a degree of legitimacy for the discredited BWIs. In practice, however, legitimacy has been difficult to win, essentially because of the failure of such policies in many contexts. As argued above, failure arises because this policy package inevitably slows growth, generates unemployment and worsens deprivation through a multiplicity of routes, any one or a combination of which can be operative depending on the circumstances of the country adopting the package.

Ensuring Bretton Woods "ownership"

What is to ensure that the policies for which social sanction is obtained by governments through the PRSP process would tally with the typical Fund-Bank strategy and is the best from the World Bank and IMF's points of view? Clearly, if the policies being recommended by governments do not tally with those considered acceptable, these would be dismissed as inappropriate and either a reflection of the play of "politics" rather than technocratic economics or the result of incompetence. For this reason the IMF and the Bank include for themselves an important role in the consultation process

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4   [Partners in Transforming Development : New Approaches to Developing Country-owned Poverty
    Reduction Strategies], Washington : World Bank Group, March 2000

to be adopted by the government. Thus the Staff Statement on the principles underlying the new guidelines on IMF conditionality state:

"Promotion of ownership depends in part on effective and inclusive processes of programme development in which the authorities and the staff are both fully engaged. Therefore, in responding to a member's request for access to Fund resources, it is expected that the initial response by the staff will be to ascertain, through dialogue, how the authorities intend to adjust policies. Based on those intentions, *the staff will endeavour to reach understandings with the authorities on a mutually acceptable means of achieving the programme goals, while paying due regard to the domestic social and political objectives, the economic priorities, and the circumstances of the member, including the causes of the balance of payments problem and the member's capacity to implement reforms in the necessary timeframe. Particularly in cases where the member's administrative capacity is weak, the staff will stand ready to advise the authorities on a range of available policy options and implementation plans, and to provide technical assistance as appropriate, so as to enable them to make informed choices.* (emphasis added)"

This attitude, which would in all probability also apply to the PRSP process suggests that the changes that are under way are more in the nature of changes in form rather than of substance. The emphasis on poverty, as during the McNamara years, the stress on "ownership" and "consultation" and the repeated references to "partnership", are all clearly aimed at establishing that the strategy being adopted is not the Bank's or the IMF's, but of the country concerned; that it has been drawn up democratically through consultations with civil society; and that there is no power asymmetry in the relation between the Fund and the Bank on the one side and the government and the country concerned on the other. This suggests that winning legitimacy is a clear objective of the process.

The Experience with the PRSP Approach

It is now just more than three years since the launch of the PRSP approach. As of February 2003 21 countries have completed the PRSP process, whereas 45 have only prepared I-PRSPs. The latter were prepared rather quickly, were in most cases a summary of existing policies and were not required to go through with an ostensibly participatory process. Further, since in March 2002, only 8 countries had completed their PRSPs, little time has elapsed since the results of the approach have begun to be implemented. Thus it is too early to even begin to assess the impact of the approach on poverty reduction and growth. As a result assessments of the approach have been of two kinds. First, those that examine the kind of policies that have got incorporated in completed PRSPs in different contexts. And, those which have been concerned with documenting and assessing the actual "process" of PRSP preparation.

The Bank and the Fund went through with an early review of the experience with the PRSP approach in an International Conference on Poverty Reduction Strategies held in January 2002. Discussions at that conference, based on a framework paper prepared by Fund-Bank staff, yielded the IFIs version of the second kind of assessments. The report summarizing the results of those discussions concluded as follows:

a. Low income countries, development agencies and civil society organizations see the PRSP approach as valuable;

b. There is widespread agreement that there is now **a greater sense of ownership,** that the PRSP process has ensured **more open dialogue,** that the process has helped render **poverty reduction more prominent** in policy debates, and that **the donor community as a whole has strongly embraced the principles of the PRSP approach;**

c. There is no need to make any modifications of the PRSP approach, but only allow for some flexibility in the approach and in the framing of policies and targets depending on national circumstances;

d. Countries need to improve their preparatory process and the content of the national strategies with emphasis on "(i) improving public expenditure management (PEM) systems; (ii) putting greater emphasis on, and building capacities for, monitoring and evaluation; and (iii) strengthening and institutionalizing participatory processes with respect to a broad range of domestic stakeholders and development partners."

e. Development partners need to better align their development assistance behind these national strategies, both through improved coordination with government efforts and through changes in their own internal processes and behaviour.

In sum, the arguments were that there is need to fine tune and strengthen the process, which in itself was seen as extremely valuable.

The Alternative

What then is the alternative for civil society groups to that of participating in and implicitly legitimizing the PRSP process? It can only be that of conducting the campaign to decide on an appropriate national development strategy and of pushing for its implementation outside of the PRSP process. *In particular, it is important to challenge the effort to dissociate the problem of poverty from the nature of the growth process.* The dangers involved in the attempt to focus on and directly deal with poverty rather than emphasize the need for a pattern of growth and employment generation which would have as its inevitable corollary poverty alleviation and sustainability need to be revealed. Put simply, the influence that the Bank exerts over the debate on development policy needs to be broken. This is no easy task.

In his "Challenge of Inclusion" address to the annual meetings of the IMF and the World Bank in September 1997, which virtually launched the PRSP agenda, Mr James D. Wolfensohn quite candidly declared: "The quality of all our work is being enhanced by the progress we have made toward becoming a Knowledge Bank. We have created Networks to share knowledge across all regions and all major sectors of development. ... My goal is to make the World Bank the first port of call when people need knowledge about development. By the year 2000, we will have in place a global communications system with computer links, videoconferencing, and interactive classrooms, affording our clients all around the world full access to our information bases - the end of geography as we at the Bank have known it." Even if civil society groups cannot match the financial resources, they must use the energy, goodwill and imagination they can access, and challenge this declared Fund-Bank drive to ideological hegemony.

This requires working out a clear alternative. There are clearly three important prerequisites for the launch of a genuinely pro-poor development strategy in most country contexts today. The first is the need to formulate, through a participatory process, the contours of such a strategy, the features of which would vary given factors like country size, endowments and institutional conditions. The second is to build broad-based consciousness of and support and social sanction for such a strategy. The third is to use this support and sanction as a means of persuading governments and the donor community to adopt and support the strategy being recommended. This would call for a substantial degree of coordination and partnership between civil society groups so that maximum benefits are derived from the available resources.

It must be stressed that the main elements of an alternative already exist in work that has been conducted in diverse circles. In what follows we attempt to spell out some of the features of the alternative, which need to be fleshed out and developed through a democratic process involving consultations with different sections of the disadvantaged. The first aspect of that alternative is that it must transcend the dichotomy between production for the domestic market and production for export. In its archetypal form that dichotomy is reflected in arguments that make a case for industrialization based on the home market because international inequality provides grounds for 'export pessimism'. In the debate on the transition to capitalism that led up to the industrial revolution, one issue of contention was the relative roles of purely 'internal' factors in the form of structural change, as opposed to 'external' factors like the effects of commercialization and the growth of markets in determining that transition. Whatever the merits of those contending arguments with regard to the principal determinant, one thing appears clear with hindsight. Successful capitalist industrialization cannot occur in a context "insulated" from world markets, but requires consciously engaging those markets as part of the strategy of growth.

We use the term "engaging" advisedly. World markets are not benign, autonomous forces that spur efficient Third World industrialisation. On the contrary they embody all the inequalities characteristic of the world system. Engaging those markets involves therefore using all the weaponry in the hands of a developing country, including the power of its State, the foundation that its home market provides, the ability of its scientific and technical personnel to override the domination implied in the control of technology by a few transnational firms and the advantages of the late entrant (varying from low wages to a less codified legal framework), to prise open those markets that inequality suggests are hermetically sealed for them.

This brings us to our second point. A successful growth strategy has to be based on an activist State. There is no relationship between the existence of an activist State and autarky or, for that matter, insularity. One valid criticism of the import substitution years in countries like India is that it neglected exports. While exports cannot constitute a basis for growth in a large developing country, in an interdependent world one cannot finance the imports that accompany the process of growth without an export thrust. It is for this reason that all successful late industrializers, including the so-called NIEs, had pursued a "mercantilist" export policy that emphasizes pushing out exports at whatever cost. Such a policy involves a continuous restructuring of the production base of the system in both quantitative and qualitative terms, which requires both technology and investment.

Investment matters for two reasons: first, the larger the size of investment the larger the share that can be devoted to modernization as opposed to 'expansion'; second, since for any incremental capital output ratio, higher investment implies higher growth, capacity expansion proceeds at a pace that allows the incorporation of new technology at the margin. For these and other reasons, the rate of growth of manufacturing exports of an economy is dependent on the investment ratio. Development economics in the early years singled out investment as the key to growth. In fact the group of highly-distinguished development economists headed by Arthur Lewis who authored the well-known Measures document of the United Nations (1951) made raising the investment ratio the cornerstone of their recommendations for development in the underdeveloped countries. The emphasis shifted only with the neo-classical critique of the late sixties . It was the efficiency of resource use, as emphasized by neo-classical writers, which gradually came to occupy centre-stage; what mattered, according to this perception then, is the economic regime within which development took place, whether or not this regime was conducive to the achievement of efficiency of resource use. What a regime conducive to such efficiency on the neo-classical argument would do to the investment ratio was never discussed, a reflection essentially of a shift of attention from the macro to the micro issues underlying the development process (and of course to a "marketist" stance in this micro discussion). In short, the investment ratio dropped out of the picture as a significant phenomenon to concentrate attention upon.

More recently, however, a range of writings from authors of rather widely differing persuasions has argued that the successful cases of industrialisation in East Asia was largely explained by an increase in factor inputs into the production process, including capital inputs in the form of high rates of capital accumulation. That is, it is not greater efficiency of resource use per se, but larger outlays of inputs at a given level of efficiency that explains success. There are good theoretical reasons why a high investment ratio ceteris paribus should give rise to a strong export growth performance. International trade in the different commodities grows, over any period, at different rates. Given these growth rates in world trade, the rate at which a particular underdeveloped country's exports grow would depend to a very significant extent upon its production-structure and the rate at which this structure is changing. In particular since the underdeveloped countries are, by and large, saddled with production-structures specializing in commodities with relatively stagnant world trade, success on the export front depends crucially upon the ability to transform the production-structure rapidly in the direction of commodities where world trade grows faster. And the rapidity of this transformation is linked to the investment ratio: the higher the investment ratio, the faster the transformation of the production-structure and hence the greater the ability to participate in the faster-growing end of the world trade, i.e. the greater the rate of export growth.

An activist State is needed not merely to raise investment rates, but to coordinate the export thrust. The evidence from east Asia suggests that such coordination was crucial, because a mercantilist industrial policy rather than market determined comparative advantage was crucial in establishing a foothold in international markets.

An important instrument in realizing the objectives of this new form of intervention is monetary policy. The evidence seems to suggest that interest rate differentials are a useful instrument for realizing an export thrust of the kind described above. This automatically suggests that financial liberalization of a kind that does not permit such differentials, and weak banking systems in which such policies can be misused need to be reformed, with the imposition of capital adequacy norms and transparent procedures. Such policies also imply some degree of sequencing of any process of "liberalization" aimed at dismantling structures characteristic of the earlier import-substituting strategy. Industrial liberalization (of licensing laws, output controls and direct price controls) must take precedence over trade liberalization, and both of them over the liberalization of the financial sector. For all these reasons, coordination by the government is crucial.

Activism of this kind has as its corollary two features. First, an activist State pursuing a mercantilist growth strategy should be in a position to discipline its industrial class. Second, activism requires the mobilization of adequate resources by the State to sustain that strategy. The need to discipline the industrial class arises because, even

while departing from the detailed physical controls characteristic of the import substitution years, the strategy being elaborated here requires a substantial degree of strategic targeting and coordination by the State. Through incentives, on the one hand, and measures to enforce compliance, on the other, the government must be in a position to influence investment decision-making at a microeconomic level. Based on the segment of the world market that is being targeted, the coordinating agency should be able to influence the choice of product, technology, scale of production and price.

Needless to say, imposing such discipline requires the backing of other sections of society, which defines the third prong of an alternative strategy. Social support for a strong State is most often won in a situation where land reforms have dismantled structures that provide the base for a collusive elite. The vital necessity of land reforms is underscored by the fact that even the successful east Asian capitalist economies owe their success inter alia to the post-war land reforms that they had.

But land reforms are needed not merely as an instrument of mobilizing political support. A thrust towards land redistribution and greater social expenditures in the rural areas which are best undertaken under the aegis of directly elected decentralized governing bodies (e.g. the panchayats in India), is essential also for widening the home market immediately, ensuring a rapid increase in agricultural output (as has happened in West Bengal, India, for example), and increasing the potential for direct and indirect employment generation. To that end land reforms would have to be accompanied by investments in the agricultural sector - in irrigation and water management and other kinds of rural infrastructure - that permit an acceleration of industrial growth. This would not only broaden the base of development but also create decision making structures through devolution that are crucial for generating the strength and the accountability needed to make the State capable of functioning as a disciplining force.

Globalization is fundamentally a centralizing tendency, drawing disparate economies and sectors into the vortex of a world controlled by a few decision makers. It also replicates this centralization in economies which it integrates into the world system, creating strong domestic interests that support the case for an open economy and a marketist strategy. The suggestion that the nation state is no more a meaningful category comes from those who find in an "integrationist" strategy greater economic benefit than from any strategy of reserving domestic space for domestic interests, so that some forces that advocated protection and state intervention in the 1950s, now support a liberal economic regime. The problem however is such a regime marginalizes the disadvantaged, who constitute a majority in most developing countries - a majority which because of centralization cannot make the case that the attenuation of the nation state challenges their already meagre standards of living. This however offers an opportunity to forces seeking an alternative to blind marketism. They constitute the

social base which can legitimize the effort to reckon with the adverse consequences of globalization. This implies that political and economic decision-making needs to be decentralized so that segments who believe that there must be an alternative to unbridled marketism can find a voice. It also means that any alternative strategy must immediately address their basic needs so as to consolidate their support for that alternative.

Thus an alternative growth strategy does involve economic "reforms", though not of the kind dictated by the Fund and the Bank to all developing countries. The objective of the reforms must be to widen the home market, to provide the broadest possible basis for development through appropriate structural change. But broadening of the market without a stimulus for its expansion can be counterproductive. And a State faced with macroeconomic disequilibria is hardly in a position to provide that stimulus. This implies that macroeconomic disequilibrium reflected in high budget deficits, has to be corrected through direct taxation and a reduction in inessential expenditure. Through greater discipline in tax-enforcement, changes in tax laws, removing certain kinds of exemptions, and an adjustment of rates for top income brackets, the revenue from income taxation should increase.

With greater resort to direct taxation, the tendency towards garnering revenue from indirect taxes and administered price-hikes would have been reversed which itself would be an anti-inflationary measure. Even so however it is also necessary in addition to protect the poor from the effects of such inflation as would occur. And this is best done through an extension of the public distribution system, both geographically into the rural areas as well as in terms of its commodity coverage. To keep the strain on the exchequer of such an extension of the public distribution system within reasonable limits, there should be an adjustment in the targeting of this system, towards the poor.

The other component of macroeconomic disequilibrium which plagues developing countries, viz. the deficit on the current account of the balance of payments, is dealt with more directly in the strategy being proposed. The growth of income and exports here are not made dependent on the pursuit of an open economic regime, but are a fallout of the activism of the State. This implies that the combination of selective but stringent import controls and an export thrust itself provides the basis for a correction of balance of payments disequilibria. Further, growth in a broad-based development strategy is not dependent on access to international finance, but uses the foothold offered in part by the home market. This implies that even the direct link between growth and vulnerability, or dependence on 'hot money' flows is snapped, achieving the principal objective of the alternative traverse.

The important feature of this package is that its focus on the expansion on the domestic market implies emphasizing employment generation and the provision of

adequate and sustainable livelihoods to the population. This is especially important not only because of the obvious welfare and equity implications, but because, in the absence of such development, the political and social tensions unleashed by the inequalizing effects of globalization are likely to become very difficult to contain.

Thus a package of policies of this kind would not merely help accelerate growth with some attention to equity, but would break the nexus between even a minimal rate of growth and an acceleration of dependence on foreign finance. Any access to finance would essentially serve to raise the rate of growth beyond that critical minimum, which is not subject to the uncertainties that the external vulnerability stemming from dependence on international capital generates. It is thus that the "opportunity" offered by the rise to dominance of finance capital can be used by a developing country to engage international markets. That is the virtuous circle that commends itself in the new environment is one in which an effort by an activist State to engage international markets for goods and services provides it with the foundations needed to engage international capital markets and use them as one more weapon to further prise open unequal international markets.

On revenue and bidders' payoffs in procurement auctions with variable quantity

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Abstract

In this paper we consider procurement auctions with variable quantity (i) We show that if the demand is concave then the expected revenue is higher under first price auctions (FPA) as compared to second price auctions (SPA) However, if demand is not concave this may not be true and we illustrate this possibility with a clear numerical example. (ii) We also demonstate that the conventional wisdom suggesting that bidders' payoffs are always higher under FPA is not true.

JEL Classification : D44, L13

Keywords : Procurement auctions, expected revenue

Introduction

In recent years there has been a small but growing literature on auctions with *variable quantity*. In a variable quantity auction, the amount sold is not fixed but depends on the level of the winning bid. This stands in contrast to traditional auction forms where a *fixed number* of units is up for sale. In such a setting, the symmetric, independent, private value (SIPV) model has been the benchmark model for auctions.[1]

The pioneering contribution on auctions with variable quantity is Hansen (1988). He constructs a procurement auction model where two risk neutral sellers compete for the right to sell to a market characterised by a negatively sloping demand curve $q(p)$. In this environment the quantity traded becomes endogenous. Here, rather than purchasing a single unit, the auctioneer (buyer) who solicits bids can purchase as many units as he wishes at the price fixed by the auction. The buyer's quantity decision is modelled by a demand function $q(p)$; if the price determined by the auction is p then the bidder will actually purchase $q(p)$ units. Each bidder's (i.e. seller's) private valuation in this model is its unit cost parameter c_i; it is assumed that bidder can produce as many units as are determined at cost c_i per unit. The rules of the variable quantity first price sealed-bid auction (FPA) is as follows. Privately and simultaneously, each bidder (seller) submits a price bid. The lowest bidder is declared the winner; the price p is set equal to the lowest bid and the buyer purchases the quantity $q(p)$. The rules of the second price sealed-bid auction (SPA) are the same, except that the price p is set equal to the second lowest bid.

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1 See Krishna (2002) and Milgrom (2004) for all the important results on the SIPV model.

In such an auction, Hansen (1988) derives the following main results. (i) The second price auction (SPA) yields a higher expected price than the first price auction (FPA).[2] (ii)The expected quantity sold is higher with FPA. (iii) The expected consumer surplus is higher with FPA. Conventional wisdom suggests that this is why most procurements take the form of FPA.[3]

Dastidar (2005b) generalises the first result to n bidders and also show that the second result is *not true*.He shows that if q(p) is concave then expected quantity sold is higher with FPA. But if q(p) is not concave no such conclusions can be drawn. In fact, he provides examples to show that expected quantity can even be lower with FPA.

It may be noted that in fixed quantity auctions the expected revenue is the same as expected prices. In such auctions for the benchmark SIPV model, we have the celebrated revenue equivalence theorem which states that the expected revenue (i.e. the expected price at which the good is traded) is same across most standard auction forms. For procurement auctions with variable quantity, expected revenue is *not* the same as expected price. Hansen (1988) and Dastidar (2005b) prove that expected prices (not revenue) are lower with FPA. There is no result on expected revenue in such auctions.

In this note we fill up this gap and compare expected revenue across FPA and SPA. We show that if demand q(p) is concave then the expected revenue is higher with FPA. But when demand is not concave this is not necessarily true. We produce an example to illustrate our point. It may be noted the present paper deals with procurement auction, where the auctioneer is a buyer rather than a seller. The bidders are the sellers. Hence, the expected revenue in our model is the same as the *expected expenditure* of the buyer. Since for concave demand functions the expected expenditure is always higher under FPA, it is not very clear why the auctioneer (the buyer) would prefer FPA over SPA in such cases, as suggested by the conventional wisdom.

We next discuss bidder's expected payoffs. Using Hansen's model, Milgrom (1989) shows that in procurement auctions with variable quantity bidder's payoffs are always higher with FPA. However, we show that this is *not true*. The point is that the conventional wisdom[4] regarding the efficacy of FPA for procurement purposes needs to be reexamined.

We now proceed to give the model of our exercise. Our structure closely follows Hansen (1988) and Dastidar (2005b).

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2   It may be noted that the SPA is outcome equivalent to the English auction and the FPA is outcome equivalent to the Dutch auction. See the appendix also.

3   In this connection see Milgrom (1989 and 2004, pp. 135-137), who provides an elegant discussion of the Hansen results. Klemperer (2004 pp. 31) and Burguet (2000, pp. 39-40) also provide a nice exposition.

4   The following is a quote from Klemperer (2004, page 31 lines 9-13) who summarises the conventional wisdom. "Hansen (1988) considers endogeneous quantity in the winner-take-all context, and shows that not only does the auctioneer prefer a FPA to the SPA (in a context where the revenue equivalence would hold if the quantity were fixed) but the FPA is also socially more efficient and may even be preferred by bidders".

2 The Model

There is an auctioneer (buyer) with demand $q(p)$ trying to procure some amount of a product through an auction. There are n firms who manufacture the product. They submit bids (that is prices) at which they want to sell. The lowest bid wins the contract.[5] In this set up, the sellers compete for the right to sell to a market characterised by a negatively sloped demand curve $q(p)$. Each firm has a constant marginal cost c_i. The buyer can choose either a FPA or a SPA.

We list the assumptions of our model below.

Assumptions

1. Seller i's MC c_i is private knowledge to the seller. Seller i knows c_i and not $c_j (j \neq i)$.

2. Independent types: $c_1 \dots c_n$ are independently distributed. Seller i believes that $c_1, c_2 \dots c_{i-1}, c_{i+1}, \dots c_n$ are random variables to which he can attribute a joint probability distribution.

3. Symmetry: Each random variable $c_i \in [\alpha, \beta]$ has the same distribution function $F(.)$ and associated density $f(.)$. That is, each seller i believes that competitors' MCs are given by $c_j \in [\alpha, \beta]$ with distribution function $F(.)$ and density function $f(.)$. We assume $\alpha > 0$.

4. The auctioneer and the sellers are all risk neutral.

5. $\forall c_i$, the function $\pi_i = (p - c_i) q(p)$ is strictly concave in p.

It may be noted that most assumptions (except the fact that this is an auction with variable quantity) are very similar to the SIPV model.

Action set of seller i is $[0, \infty) \cup \{No\}$. That is, each seller can quote either a non-negative number or can say "no" which means that it drops out of the bidding process.

Strategies are bids which is a function of types (costs)

$$b_i(c_i) : [\alpha, \beta] \rightarrow [0, \infty) \cup \{No\}$$

We look for a profile of strategies that constitute a Bayesian- Nash equilibrium. Before giving our main results we need to discuss some preliminaries on order statistics.

2.1 Order Statistics : some notations and preliminaries

Let $y_1, y_2 \dots y_n$ denote a random sample of size n drawn from $F(.)$. Then $x_1 \leq x_2 \dots \leq x_n$ where x_is and y_is arranged in increasing magnitudes, are defined to be the order statistics corresponding to the random sample $y_1, y_2 \dots y_n$.

We would be interested in x_1 (lowest order statistic) and x_2 (second lowest order

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5   In case of a tie the winner is selected randomly. It may be noted that such ties occur with zero
     probability in equilibrium.

statistic). The corresponding distribution functions and density functions are $F_1(.), F_2(.)$ and $f_1(.), f_2(.)$. Note that

$$F_1(x) = 1 - (1 - F(x))^n \text{ and } F_2(x) = 1 - (1 - F(x))^n - nF(x)(1 - F(x))^{n-1}$$

$$f_1(x) = n(1 - F(x))^{n-1} f(x) \text{ and } f_2(x) = n(n-1)F(x)(1 - F(x))^{n-2} f(x)$$

It may be noted that x_1 and x_2 are not independent although the underlying distributions are. We will be using the above formulae in our proofs. See the appendix of Wolfstetter (1999) or Mood, Graybill and Boess (1974, pp. 251-265) for a discussion of order statistics.

3 The Equilibrium in Auctions

3.1 Equilibrium bidding in FPA

In the FPA if firm j is the winner it gets

$$\pi_j = (b_j - c_j)q(b_j)$$

All the losers get zero. It follows from Hansen (1988) that there exists a symmetric Bayesian Nash equilibrium with strategies b (c_i) which is strictly increasing in c_i. $b(c_i)$ olves the following differential equation (1) with the boundary condition (1a).

$$\frac{db}{dc} = (n-1)\frac{f(c_i)}{1 - F(c_i)}\left[\frac{(b(c_i) - c_i)q(b(c_i))}{q(b(c_i)) + (b(c_i) - c_i)q'(b(c_i))}\right] \tag{1}$$

$$\text{and } b(\beta) = \beta \tag{1a}$$

It may be noted that $b(c_i) > c_i$ for all $c_i \in [\alpha, \beta)$. In equation (1), the term in the denominator $q(b(c_i)) + (b(c_i) - c_i)q'(b(c_i))$ is strictly positive in the relevant range. Equation (1a) suggests that the worst-off seller - the seller with highest possible cost, β - has zero expected profit. It can also be shown that $b(c_i)$ is a concave function.

We now proceed to provide a brief explanation of the above claims. We will closely follow Hansen (1988) here. A seller with cost c_i quotes b_i to maximise

$$\text{expected profit} = E(\pi_i) = \text{Pr ob.}(\text{win}|b_i)q(b_i)(b_i - c_i)$$

When there is a common bidding strategy $b(c_i)$, where $b(.)$ is strictly increasing, the probability of winning is equal to $(1 - F(c_i))^{n-1}$, the probability that the other sellers' costs are higher than his. Then

$$E(\pi_i) = (1 - F(c_i))^{n-1}q(b(c_i))(b(c_i) - c_i)$$

From the above it is clear $b(c_i) > c_i$; because otherwise expected profits are going to be non-positive. Now, fix the strategy $b(c)$, and allow each seller to choose the c he wishes to report. Then $b(c)$ is an equilibrium strategy if sellers choose honest revelation (i.e. they choose to report $c = c_i$). Under this

$$E(\pi_1) = (1 - F(c))^{n-1} q(b(c))(b(c) - c_1)$$

Taking the derivative w.r.t. c, equating this to zero (for the first order condition) and then noting that in equilibrium $c = c_1$ we get equation (1).

The prices quoted by the sellers lie between $b(\alpha)$ and β. In a FPA, the firm with the lowest cost bids the lowest price and wins the contract. The price at which the items are procured is the lowest of all bids. Therefore, the expected price and expected quantity sold in a FPA is as follows.

$$E^I(price) = \int_\alpha^\beta b(x)f_1(x)dx \text{ and } E^I(qty.) = \int_\alpha^\beta q(b(x))f_1(x)dx$$

Note that $f_1(x)$ is the density function of the lowest order statistic. Similarly the expected revenue (or the expected expenditure of the buyer) in a FPA is the following

$$E^I(rev.) = \int_\alpha^\beta b(x)q(b(x))f_1(x)dx$$

3.2 Equilibrium bidding in SPA

It can be easily shown that in equilibrium each seller bids his MC c_1. Prices quoted by the sellers in the SPA will lie between α and β. In this auction the firm with the lowest cost wins the contract but the price at which the good is sold is equal to the second lowest cost. The expected price and expected quantity traded in the SPA is as follows.

$$E^{II}(price) = \int_\alpha^\beta xf_2(x)dx \text{ and } E^{II}(qty.) = \int_\alpha^\beta q(x)f_2(x)dx$$

Note that $f_2(x)$ is the density of the second lowest order statistic. Similarly the expected revenue (or the expected expenditure of the buyer) in a SPA is the following

$$E^{II}(rev.) = \int_\alpha^\beta xq(x)f_2(x)dx$$

4 Expected revenue and bidder's profits

4.1 Expected Revenue

From Hansen (1988) and Dastidar (2005b) it follows that (i) $E^I(price) < E^{II}(price)$ and (ii) If q(p) is concave then $E^I(qty.) > E^{II}(qty.)$. However if q(p) is not concave then $E^I(qty.)$ may be lower than $E^{II}(qty.)$.

We now provide our main results and their proofs.

Proposition 1 If q(p) is concave then expected revenue is higher with FPA as compared to SPA.

That is,

$$q(p) \text{ concave} \Rightarrow \int_\alpha^\beta b(x)q(b(x))f_1(x)dx > \int_\alpha^\beta xq(x)f_2(x)dx$$

Proof Note that $f_1(x) = n(1-F(x))^{n-1}f(x)$ (see the discussion on order statistics). Therefore,

$$E^I(\text{Re v.}) = \int_\alpha^\beta b(x)q(b(x))f_1(x)dx = \int_\alpha^\beta b(x)q(b(x))n(1-F(x))^{n-1}f(x)dx \qquad (2)$$

Let $u(x) = nb(x)q(b(x))(1-F(x))^{n-1}$. Therefore from (2) we get

$$\int_\alpha^\beta b(x)q(b(x))f_1(x)dx = \int_\alpha^\beta u(x)F'(x)dx = \left[u(x)F(x)\right]_\alpha^\beta - \int_\alpha^\beta F(x)u'(x)dx \qquad (3)$$

Note that since $F(\alpha) = 0$ and $F(\beta) = 1$ we have $\left[u(x)F(x)\right]_\alpha^\beta = 0$. Therefore from (3) we have,

$$\int_\alpha^\beta b(x)q(b(x))f_1(x)dx$$

$$= -\int_\alpha^\beta F(x)u'(x)dx$$

$$= \int_\alpha^\beta F(x)\left[\begin{array}{c} n(n-1)(1-F(x))^{n-2}f(x)b(x)q(b(x)) \\ -n(1-F(x))^{n-1}b(x)q'(b(x)b'(x) - n(1-F(x))^{n-1}b'(x)q(b(x)) \end{array}\right]dx$$

Using the formula of $f_2(x)$ and with some algebric manipulation we can write the above as,

$$\int_\alpha^\beta b(x)q(b(x))f_1(x)dx$$

$$= \int_\alpha^\beta f_2(x)\left[b(x)q(b(x)) - \frac{1-F(x)}{(n-1)f(x)}b(x)q'(b(x))b'(x) - \frac{1-F(x)}{(n-1)f(x)}b'(x)q(b(x))\right]dx$$

Using (1) to replace $b'(x)$ and rearranging and cancelling some terms we get,

$$\int_\alpha^\beta b(x)q(b(x))f_1(x)dx = \int_\alpha^\beta f_2(x)\left(\frac{x[q(b(x))]^2}{q(b(x)) + (b-x)q'(b(x))}\right)dx \qquad (4)$$

Note that,

$$E^I(\text{Re v.}) - E^{II}(\text{Re v.})$$

$$= \int_\alpha^\beta b(x)q(b(x))f_1(x)dx - \int_\alpha^\beta xq(x)f_2(x)dx$$

$$= \int_\alpha^\beta f_2(x)\left(\frac{x[q(b(x))]^2}{q(b(x)) + (b(x) - x)q'(b(x))} - xq(x)\right)dx \text{ (by using (4))}$$

$$= \int_\alpha^\beta \frac{x\,f_2(x)}{q(b(x)) + (b(x) - x)q'(b(x))}\left([q(b(x))]^2 - q(x)q(b(x)) - q(x)q'(b(x))(b(x) - x)\right)dx$$

$$= \int_\alpha^\beta \frac{x\, f_2(x)}{q(b(x)) + (b(x) - x)q'(b(x))} \left[q(b(x))q(b(x)) - q(x)) - q(x)q'(b(x))(b(x) - x) \right] - (5)$$

From the mean value theorem it follows that

$$q(b(x)) - q(x) = (b(x) - x)q'(z) \text{ for some } z \in (x, b(x))$$

Using the above in (5) we note that

$$E^I(\text{Rev.}) - E^{II}(\text{Rev.})$$

$$= \int_\alpha^\beta \frac{x\, f_2(x)}{q(b(x)) + (b(x) - x)q'(b(x))}(b(x) - x)\left[q(b(x))q'(z) - q(x)q'(b(x)) \right] \quad (6)$$

Since $x < z < b(x)$, $q'(.) < 0$ and $q(.)$ is concave we have $q'(b(x)) \le q'(z) < 0$ and $q(x) > q(b(x))$. Also $b(x) - (x) > 0$ and $q(b(x)) + (b(x)-x)\, q'(b(x)) > 0$. Using all these in (6) we get that if $q(.)$ is concave then $E^I(\text{Rev.}) - E^{II}(\text{Rev.}) > 0$.

Comment In the SIPV auction model where one fixed item is up for sale, the expected price at which the good is sold is same across FPA and SPA (the revenue equivalence theorem). Note that for auctions with one fixed item, expected price is same as expected revenue. In variable quantity auction this is not so. From Hansen (1988) and Dastidar (2005b) we know that in procurement auctions with variable quantity, the *expected prices* are lower under FPA as compared to SPA. Proposition 1 of the present paper shows that expected revenue (which is same as the buyer's expected expenditure) is higher under FPA if q (p) is concave. Conventional wisdom suggests that one of the reasons for preponderance of FPA in procurements is that expected prices are lower under FPA. However, for a buyer who is trying to procure some items through an auction, expected expenditure is also very important. Since for concave demand functions this expected expenditure is higher under FPA; such a buyer should prefer SPA over FPA and this stands in sharp contrast to the conventional wisdom.

We now show with an example that if q (p) is not concave expected revenue may be lower under FPA.

Example 1   To show that E^I (Rev.) can be strictly lower than E^{II}(Rev.) we produce the following example. Let $q(p) = 1/\sqrt{p}$. In this example we have

$$q(b(x)) = \frac{1}{\sqrt{b(x)}}, q'(b(x)) = -\frac{1}{2(b(x))^{\frac{3}{2}}} \text{ and } q(x) = \frac{1}{\sqrt{x}}$$

Then clearly,

$$q(b(x))[q(b(x)) - q(x)] - q(x)(b(x) - x)q'(b(x))$$

$$= -\frac{1}{2}\frac{-2\sqrt{b(x)x}+b(x)+x}{\sqrt{x}(b(x))^{\frac{1}{2}}} = -\frac{1}{2}\frac{\left(\sqrt{b(x)}-\sqrt{x}\right)^2}{\sqrt{x}(b(x))^{\frac{1}{2}}} < 0 \text{ for all } x \in [\alpha,\beta)$$

$$\Rightarrow E^{I}(\text{Rev.}) < E^{II}(\text{Rev.}) \quad \text{from (6)}$$

The interesting point to note is that the conclusion of the above example holds true foranyF(c) (the distribution function of costs). Also, we did not need to compute the bidding strategies b(x) explicitly to arrive at our conclusions.

4.2 Bidder's payoff

Results in the literature suggest that bidders in our model will always prefer FPA in the sense that for any c the expected payoff to the bidder (i.e. the seller) with cost c is higher with FPA. Milgrom (1989) provides a proof of this result. We claim that this result is not generally true.

Consider a firm with cost c. In any auction the expected profit to thefirm in equilibrium is equal to probability of winning the contract multiplied by the expected profit; given that it has won the contract. In both FPA and SPA, the firm with the lowest cost wins. For a firm with cost c, the probability of winning is the probability that its cost is the lowest and this is equal to $(1-F(c))^{n-1}$. In a FPA,ifafirm wins the contract its profit is equalto(b(c)–c)q(b(c)). Therefore, in a FPA the expected profit to afirm with cost c is

$$\pi^{I}(c) = (1-F(c))^{n-1}(b(c)-c)q(b(c)) \qquad (7)$$

Expected profit in a SPA is more complicated. In this auction a firm with cost c bids c.The probability of winning the contract is $(1-F(c))^{n-1}$. If a firm wins the contract, the price at which the good is sold is equal to x, which is the lowest among the other (n–1) firms' costs. The profit accruing to the firm in this case is (x–c)q(x). Note that the firm with cost c wins the contract if and only if c < x. The density of x is $(n-1)(1-F(x))^{n-2}f(x)$ and the probability that x is greater than c is $(1-F(c))^{n-1}$. Therefore, the conditional density of x, given that it is greater than c is

$$\frac{(n-1)(1-F(x))^{n-2}f(x)}{(1-F(c))^{n-1}}$$

Therefore, in a SPA the expected profit to a firm with cost c is

$$\pi^{II}(c) = (1-F(c))^{n-1} \times \text{Exp.}((x-c)q(x)|x > c)$$

$$= (1-F(c))^{n-1} \int_{c}^{\beta}(x-c)q(x)\left(\frac{(n-1)(1-F(x))^{n-2}f(x)}{(1-F(c))^{n-1}}\right)dx$$

$$= \int_c^\beta (x-c)q(x)(n-1)(1-F(x))^{n-2}f(x)dx \tag{8}$$

Dastidar (2005a) shows that if $q(p) = \frac{1}{p}$, then for all c, $\pi^I(c) = \pi^{II}(c)$. To illustrate this with a particular distribution function we take the following example.

Example 2 Let $q(p) = \frac{1}{p}, n = 2, \alpha = 1, \beta = 2$ and F(.) be uniform over [1,2]. That is, we have f(x)=1 and F(x)=2–x. Here in FPA the bidding strategy in equilibrium is given by $b(c) = \frac{2-c}{\ln 2 - \ln c}$. Therefore

$$\pi^I(c) = (1-F(c))^{n-1}(b(c)-c)q(b(c))$$

$$= (2-c)\left(\frac{2-c-c\ln 2 + c\ln c}{\ln 2 - \ln c}\right)\frac{\ln 2 - \ln c}{2-c}$$

$$= 2-c-c\ln 2 + c\ln c$$

and

$$\pi^{II}(c) = \int_c^\beta (x-c)q(x)(n-1)(1-F(x))^{n-2}f(x)dx$$

$$= \int_c^2 \frac{x-c}{x}dx = 2-c-c\ln 2 + c\ln c$$

Comment

Note that $\pi^I(c) = \pi^{II}(c)$ for all c in this example. This clearly shows that the Milgrom (1989) contention claiming that $\pi^I(c) > \pi^{II}(c)$ for all c is simply not true. Note that Milgrom's proof is based on the premise that expected quantity is always higher with FPA. But we now know that this is not true (see Dastidar, 2005b). This forms the basis of the mistake in Milgrom's claim.

We now proceed to demonstrate with another example that it is in fact possible to get $\pi^I(c) < \pi^{II}(c)$, at least for some c.

First we need to develop some preliminaries. Note that (from (7))

$$\frac{d\pi^I(c)}{dc} = -(n-1)(1-F(c))^{n-2}f(c)(b(c)-c)qb(c)$$

$$+(1-F(c))^{n-1}[(b'(c)-1)qb(c)+(b(c)-c)q'(b(c))b'(c)]$$

Using (1) to replace for b(c) in the above equation and cancelling some terms we get,

$$\frac{d\pi^I(c)}{dc} = -(1-F(c))^{n-1}qb(c)) \tag{9}$$

From (8) we compute that

$$\frac{d\pi^{II}(c)}{dc} = \int_c^\beta (n-1)(1-F(c))^{n-2}f(x)q(x)dx \tag{10}$$

From (7)-(10) it is clear that both $\pi^I(c)$ and $\pi^{II}(c)$ are strictly decreasing in c and $\pi^I(\beta) = \pi^{II}(\beta) = 0$. From (10) we get that

$$\frac{d\pi^{II}(c)}{dc} = \int_c^\beta q(x)d(1-F(x))^{n-1}$$

$$= [q(x)(1-F(x))^{n-1}]_c^\beta - \int_c^\beta (1-F(x))^{n-1}q'(x)dx \text{ (integrating by parts)}$$

$$= -(1-F(c))^{n-1}q(c) - \int_c^\beta (1-F(x))^{n-1}q'(x)dx \tag{11}$$

Example 3 Let $q(p)=1+\frac{1}{p}$, n=2, α=0, β=1 and F(.) is uniform over [0,1]. Therefore F(x) = x and f(x)=1.

From (1) and (1a) we know that for this example, in a FPA the bidding strategy $b(c_i)$ solves the following differential equation and boundary condition.

$$\frac{db}{dc} = \frac{(b(c)-c)(1+\frac{1}{b(c)})}{(1-c)(1+\frac{c}{(b(c))^2})}$$

$$b(1) = 1$$

We cannot compute the explicit solution to the above differential equation. However, we will show analytically that for all $c \in [0,1], \pi^{II}(c) \geq \pi^I(c)$ and $\pi^{II}(c) > \pi^I(c)$ for some c. In this example,

$$\pi^I(c) = (1-c)(b(c)-c)(1+\tfrac{1}{b(c)}) \tag{12}$$

and

$$\pi^{II}(c) = \int_c^1 (x-c)\left(1+\frac{1}{x}\right)dx = \frac{3}{2} - 2c + \frac{1}{2}c^2 + c\ln c \tag{12a}$$

Define $G(c) = \pi^{II}(c) - \pi^I(c)$. Note that G(1)=0. Using (9) to (11) we get

$$G'(c) = \frac{1}{b(c)}(b(c)\ln c + 1 - c) \tag{13}$$

From (13) note that $G'(c) = 0 \Rightarrow b(c) = -\frac{1-c}{\ln c}$.

$$b(c) = -\frac{1-c}{\ln c}$$

$$\Rightarrow G(c) = \frac{3}{2} - 2c + \frac{1}{2}c^2 + c\ln c - (1-c)\left(-\frac{1-c}{\ln c} - c\right)\left(1 - \frac{\ln c}{1-c}\right)$$

$$= \frac{-\ln c + c^2 \ln c - 2c^2 + 4c - 2}{-2\ln c} \tag{14}$$

Since for all $c \in [0,1]$, $\ln c < 0$ the denominator of (14) is positive. Note that the numerator is also positive for all $c \in [0,1]$. We plot $(-\ln c + c^2 \ln c - 2c^2 + 4c - 2)$ (the numerator) in figure 1 below to show this.
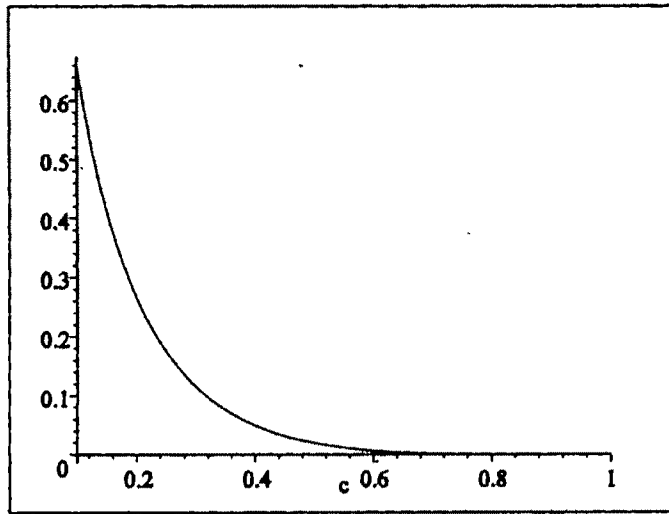
Figure 1

This means that in our example $b(c) = -\frac{1-c}{\ln c} \Rightarrow G(c) > 0$. Now $G'(c) = 0 \Longleftrightarrow b(c) = -\frac{1-c}{\ln c}$. Therefore

$$G'(c) = 0 \Rightarrow G(c) > 0 \tag{15}$$

From (13) it is clear that when c is close to zero $G'(c)$ is strictly negative. The reason is as follows. $\forall c, b(c) \in [b(0),1]$, where $b(0) > 0$. Also $\ln c$ is a very large negative number when c is close to zero. This makes $G'(c)$ strictly negative for such c.

We first claim that G(0) > 0. Suppose on the contrary $G(0) \leq 0$. Since $G'(c) < 0$, for c sufficiently small the graph of G(c) starting from 0, goes down and G(c) attains strictly negative value for some c. Since G(1) = 0, and G(c) is continuous, the graph of G(c) must turn up somewhere at least once. That is, $G'(c)$ should be zero at some point. Follow the graph of G(c) from c = 0 onwards and take the first such turning point of G(c). Here G(c) has a negative value and the slope is zero. But this contradicts (15). Therefore it is not possible to have $G(0) \leq 0$. Hence we get G(0) > 0. Since G(c) is continuous, we have that G(c) > 0 for all c's close to zero.

Now we show that $G(c) \geq 0$ for all $c \in (0, 1)$. Suppose on the contrary G(c) < 0 for some c = c *. Since G(1) = 0, the graph of G(c) starting from c* must turn up somewhere in between c* and 1. Using the same logic as in the previous paragraph we can rule out the possibility that G(c) < 0 for some c. Therefore we get $G(c) \geq 0$ for all $c \in (0, 1)$. Combining everything we note that the following conclusions emerge in our example.

1. G(0)>0. Since G(c) is continuous we get G(c)>0 for all c sufficiently close to zero.

2. $G(c) \geq 0$ for all $c \in (0, 1)$.

3. Since $G(c) = \pi^{II}(c) - \pi^{I}(c)$, this implies that $\pi^{II}(c) > \pi^{I}(c)$ for some c $\pi^{II}(c) \geq \pi^{I}(c)$ for all c.

5 Conclusion

In this note we have shown that in procurement auctions with variable quantity; if q(.) is concave then the expected revenue (which is the same as expected expenditure of the buyer) is higher under FPA. However, if q(.) is not concave then this may not be true. We demonstrated this possibility with an example. We also showed that the result in the literature suggesting that bidders' payoffs are always higher under FPA is not true. We illustrated this with two examples. In one example $\pi^{I}(c) = \pi^{II}(c)$ for all c.

In the other one, $\pi^{I}(c)$ is shown to be strictly lower than $\pi^{II}(c)$ for at least some c. As noted in the introduction, the point is that the supposed efficacy of FPA for procurement purposes, as suggested by conventional wisdom, needs to be thoroughly reexamined.

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Joint ventures and foreign subsidiaries

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Abstract

We build a simple model consisting of an existing joint venture between a domestic firm and a foreign firm, and a potential foreign entrant We consider a situation where either one of the foreign firms can profitably open a wholly owned subsidiary (though not both of them). The domestic firm can, however, by invoking some appropriate domestic regulation, Press Note 18 in case of India (PN18), prevent its foreign partner from opening a subsidiary, in which case the potential entrant will enter. The question is whether the domestic firm will find it optimal to do so. We demonstrate that, in our framework, the domestic partner will never invoke PN18.

JEL Classification : D43, F23, L13, L5.

Keywords : Joint venture, subsidiary, press note 18.

1 Introduction

Suppose that there is an existing joint venture between a domestic and foreign firm and the foreign firm wants to set up a new wholly owned subsidiary. In India, this used to require a no objection certificate (NOC) from the domestic partner. This is the so called Press Note 18 (1998 Series), of the Government of India, Ministry of Finance (PN18 from now on).[1] While PN18 has now been repealed, there are periodic calls for re-instating it. In this paper we seek to analyze the theoretical foundations of such legislation.

We build a simple model consisting of an existing joint venture between a domestic firm and a foreign firm, and a potential foreign entrant. We consider a situation where either one of the foreign firms can profitably open a wholly owned subsidiary (though not both of them). The domestic firm can, however, by invoking PN18, prevent its foreign partner from opening a subsidiary, in which case the potential entrant will enter. The question is whether the domestic firm will find it optimal to do so. We demonstrate that, in our framework, the domestic partner will never invoke PN18. The intuition is simple. In case PN18 is invoked, it is the potential foreign entrant which is going to open a subsidiary. In that case the domestic partner is going to face a greater level of competition, compared to the case when the subsidiary is set up by its partner, since the potential entrant has no stake in the existing JV. Thus the domestic

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1 See, for example, the Economic Times, August 5, 2003, for a discussion of the debate surrounding PN18

partner prefers to face its existing partner, rather than the potential entrant. Thus, from a policy point of view, it does not matter whether PN18 is in operation or not.

The only other paper in the literature that seeks to address this question formally is Kabiraj and Marjit (2004). The essential difference between the two papers is that, whereas, in our framework, invoking PN18 leads to entry by another foreign firm, in the Kabiraj and Marjit (2004) framework, it does not. The reason that we allow for such potential entry is that, in a liberalizing economy, it seems important to allow for the possibility of such entry, at least in certain cases.

The rest of the paper is organized as follows. Section 2 contains the model and the analysis. Section 3 concludes.

2 The Model

There is an existing joint venture (JV) between a domestic firm (firm 1) and a foreign firm (firm 2).[2] There is also another foreign firm (firm 3), that is a potential entrant. The market demand is

$$p = a - q, \tag{1}$$

where $a > 0$, and p and q denote market price and quantity respectively. The cost function of the JV is

$$c.q, \tag{2}$$

where $0 < c < a$.

Let the share of the domestic firm in JV profits be α, where $0 < \alpha < 1$. Government regulations ensure that the JV is controlled by the domestic firm, irrespective of α.

To begin with, the marginal cost of any one of the firms, in case they decide to open a wholly owned subsidiary, is $c' q$, where $c' > a$. Hence initially the JV acts as a monopoly. Clearly, JV output $Q_0 = \dfrac{a-c}{2}$ and aggregate JV profits $\Pi = \dfrac{(a-c)^2}{4}$, which is distributed in the ratio $\alpha : 1 - \alpha$ among the domestic and the foreign partner.

We then consider a situation where the foreign firms, i.e. firm 2 and firm 3, acquire the ability to operate at a lower marginal cost in case they open a wholly

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2   There is a reasonably large literature on various aspects of JV formation and break-down. This includes Chan and Hoy (1991), Chao and Yu (1996), Choi (1993), Combs (1993), Das (1998, 1999), Kabiraj (2001), Kabiraj and Marjit (1993, 2002, 2004), Kabiraj and Roy Chowdhury (2003), Katz (1986), Marjit (1990, 1991), Marjit and Mukherjee (1998, 2001), Marjit and Roy Chowdhury (2004), Mukherjee and Sengupta (2001), Ray Chaudhuri (1995, 2000), Roy Chowdhury and Roy Chowdhury (1999a, 1999b, 2000a, 2000b, 2001a, 2001b, 2002), Sinha (2001a, 2001b) and Svejnar and Smith (1986).

owned subsidiary. For simplicity we assume that this marginal cost is c also. This reduction in marginal cost can be due to either of two reasons. First, the foreign firms may acquire a greater knowledge of local conditions like distribution channels etc.[3] Second, the foreign firms may benefit from a worldwide improvement in technology.[4] Let F denote the fixed cost of opening a subsidiary for both firm 2 and firm 3. We assume that F is not too large in the sense of Assumption 1 below.

Assumption 1. $\dfrac{(a-c)^2}{(2+\alpha)^2}, \dfrac{(a-c)^2}{9} > F$ and $\dfrac{(a-c)^2}{(2+\alpha)^2} - F > \dfrac{(1-\alpha)(a-c)^2}{9}$

Further, we assume that F is large enough so that, in case both firm 2 and firm 3 open subsidiaries, their net profits are negative.

We solve for the subgame perfect Nash equilibrium of the following multi-stage game.

Stage 1. Firm 1 decides whether to invoke PN18 or not.

Stage 2. Firm 2 decides whether to open a wholly owned subsidiary or not. Of course, in case firm 1 had invoked PN18 in stage 1 earlier, then firm 2 does not have the option of opening a subsidiary.

Stage 3. Firm 3 decides whether to open a wholly owned subsidiary or not.

Stage 4. The firms in the market compete over quantity.

We solve the game using a standard backwards induction argument. Consider **stage 4** first. There are two cases to consider.

Case 1. We first consider the case where it is firm 2, i.e. the JV partner who is entering. In this case the problem of the domestic firm is

$$\max_{q} \alpha(a - q - q_2 - c)q \tag{3}$$

where the q denotes JV output and q_2 denotes the output of firm 2 in the subsidiary. Thus firm 2's problem is

$$\max_{q_2}(1-\alpha)(a - q - q_2 - c)q_1 + (a - q - q_2 - c)q_2 - F \tag{4}$$

Note that while deciding on the optimal level of output in its subsidiary, firm 2

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3   It may be reasonable to assume that firm 2 will have a greater reduction in costs since it is already producing in this market. However, for simplicity, we assume that the cost reductions are symmetric.

4   We assume that the technological improvement is such that the new technology is qualitatively different from the existing one, and cannot be incorporated into the existing JV.

takes into account the fact that it obtains a share of JV profits. This is central to our argument.

Simultaneously solving equations (3) and (4), we find that in equilibrium

$$q^* = \frac{a-c}{2+\alpha}, \quad q_2^* = \frac{\alpha(a-c)}{2+\alpha} \text{ and } q^* + q_2^* = \frac{(1+\alpha)(a-c)}{2+\alpha} \tag{5}$$

Thus the domestic firm's equilibrium level of profit is

$$\Pi_1^* = \frac{\alpha(a-c)^2}{(2+\alpha)^2} \tag{6}$$

and the equilibrium profit level of firm 2 is

$$\Pi_2^* = \frac{(a-c)^2}{(2+\alpha)^2} - F \tag{7}$$

Case 2. We then examine the case where firm 3 opens a subsidiary and there is a standard Cournot game between the JV and firm 3. Let q denote JV output and q_3 denote the output of firm 3 in the subsidiary. As is well known, in equilibrium

$$q' = q_3' = \frac{a-c}{3} \text{ and } q' + q_3' = \frac{2(a-c)}{3} \tag{8}$$

Thus in equilibrium the domestic firm's profit is

$$\Pi_1' = \frac{\alpha(a-c)^2}{9} \tag{9}$$

that of firm 2 is

$$\Pi_2' = \frac{(1-\alpha)(a-c)^2}{9} \tag{10}$$

and that of firm 3 is

$$\Pi_3' = \frac{(a-c)^2}{9} - F \tag{11}$$

We then solve for the outcome in **stage** 3. Given Assumption 1, it follows that $\Pi_3' > 0$. Thus firm 3 will open a subsidiary in case firm 2 has not already opened one. However, in case firm 2 has already opened a subsidiary, it decides not to enter.

Next consider the outcome in **stage** 2. Given Assumption 1, $\Pi_2^* > 0$ so that it is

profitable to enter. Further, from Assumption 1, firm 2's profit from entering, i.e. Π_2^*, exceeds that from not entering, i.e. Π_2'. Thus firm 2 opens a subsidiary provided firm 1 issues a NOC to it.

Finally, consider the outcome in **stage 1**. First note that $q^* + q_2^* < q' + q_3' $.[5] Thus the consumers' surplus is always greater in case PN18 is invoked. The intuition is simple. In case PN18 is invoked, it is firm 3 that enters, rather than firm 2. Since firm 3 has no stake in the JV, it competes more vigorously with the JV, leading to an increase in the aggregate output.

We then compare the profit level of the domestic firm under the two cases. Note that $\Pi_1^* > \Pi_1'$ for all α.[6] The intuition is the same as before. Compared to firm 2, firm 3 competes much more vigorously with the JV. Thus the domestic firm never invokes PN18 and the foreign partner, i.e. firm 2, is allowed to open a subsidiary.

Summarizing the preceding discussion we obtain the central result of this paper.

Proposition 1. *In equilibrium, Press Note 18 is never invoked and the foreign partner is allowed to open a subsidiary.*

The above proposition suggests that it does not matter too much whether PN18 is revoked or not. In equilibrium, the domestic firm is not going to invoke PN18 anyway. Interestingly, given that the consumers' surplus is higher in case PN18 is invoked, invoking PN18 might be welfare improving.

Hence from a policy point of view our paper is neutral to PN18. Note that these results are rather different from those reached by Kabiraj and Marjit (2004). The difference in results can be traced to the difference in the framework. Under our setup, once PN18 is invoked, there is entry by a relatively more competitive foreign firm, so that the domestic firm does not want to invoke it. Under the Kabiraj and Marjit (2004) framework, however, there is no threat of entry by other firms. Hence once PN18 is invoked the JV continues to exist as a monopoly. Thus, under certain conditions, the domestic partner may prefer to invoke it. Further, this may lead to a fall in welfare. Thus Kabiraj and Marjit (2004) reaches a somewhat more negative conclusion as to the impact of PN18.[7] Which one of the two frameworks is the more relevant one is an empirical question and the answer is likely to vary from case to case.

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5   This simplifies to showing that $\alpha < 1$, which is satisfied.

6   This simplifies to showing that $9 > (2 + \alpha)^2$, which is always satisfied.

7   However, they also show that there may be conditions under which PN18 is not invoked by the domestic firm, but it is welfare improving if it is In fact, the same conclusion holds in our framework also.

3 Conclusion

We begin by discussing some robustness issues. Note that we work with very simple linear demand and cost functions. This, however, is for technical reasons alone. Given the simplicity of the underlying intuition, the results in the paper should go through for general demand and cost functions.

Next recall that we assume that firm 2 and firm 3 are symmetric as far as their cost functions are concerned. Suppose, however, that firm 2 has a lower marginal cost compared to firm 3 (in case they open wholly owned subsidiary).[8] Now in case firm 2 opens a subsidiary, there are two effects in operation. First, it is going to be 'less competitive' compared to firm 3 since it has a stake in the JV. On the other hand, it is going to be 'more competitive' compared to firm 3 since it is more efficient, i e. it has a lower marginal cost. In case firm 2 is very efficient compared to firm 3, the second effect may dominate, and the domestic firm may prefer to invoke PN18 even in this framework. Which one of these effects dominate is an empirical question and the answer will vary from case to case.

In conclusion our paper demonstrates the importance of allowing for possible entry by other foreign firms, an assumption that is not too unrealistic under the current scenario where most LDCs are moving towards liberalization Doing so allows us to arrive at conclusions that are not only at variance with the existing theoretical literature, i.e. Kabiraj and Marjit (2004), but also the popular wisdom. Recall that the popular wisdom suggests that domestic partners in JVs can, by using PN18 judiciously, ensure that their profit levels do not decline. Our results suggest that PN18 in fact may be redundant, since domestic firms may prefer not to use it at all.

Finally of course our paper captures only a few aspects of a complex policy question. There are other issues that can and should be brought into the picture. For example, one issue ignored here is the possible signalling effect of repealing, or re-instating PN18. The analysis of such issues, however, must await future work.

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8   One reason could be that firm 2, being in the domestic market already, has greater access to the market and a greater knowledge of local conditions compared to firm 3.

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Doping in Sport: An Economic Analysis

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Abstract

This paper examines the impact of various regulatory policies on the decision to dope by athletes. The analysis suggests that punishment schemes involving lump-sum fines and bans, which are commonly used to control doping, create biases, and do not achieve their goal of levelling the playing field. Under plausible assumptions, these schemes are more likely to control doping for risk averse athletes compared to risk neutral ones, poorer athletes compared to their wealthier counterparts, and athletes with high earning potentials relative to those with lower potential. A marginal penalty scheme where athletes are fined based on the quantity of dope detected eliminates these biases, and emerges as a superior policy for levelling the playing field.

JEL Classification : D81, K42

Keywords : Doping, anti-doping regulation, risk aversion and risk neutrality.

1. Introduction

Doping in sport is not a recent phenomenon, and there is evidence to suggest that it was prevalent as early as the ancient Olympic games in the 3rd century B.C. (de Merode (1999), Berentsen (2002)). Doping creates horizontal inequities and alters the playing field, which no longer remains levelled. For example, an inferior athlete on drugs can be a winner against a more talented athlete not on drugs. It is the possibility of these unfair outcomes, among other concerns, which has resulted in the control of doping in sport.

Despite the ancient origins of doping, the control of doping is a fairly recent phenomenon with the first compulsory Olympic drug testing taking place at the Winter Olympic Games in 1968. The subsequent thirty years witnessed a growing awareness of this problem and it reached its peak in 1998 when widespread doping in the Tour de France was exposed. In February 1999, the International Olympic Committee convention in Lausanne established the World Anti-Doping Agency (WADA), an independent organization headquartered in Montreal, Canada. Its task was the development and enforcement of an Anti-Doping Code. The objective of the Code is, first, to protect athletes' rights to participate in drug free sport, and secondly, to harmonize anti-doping regulations across all sports in all countries, thereby creating a level field (WADA (2003)). A crucial element of the WADA vision is the active involvement of governments, National Olympic Committees (NOCs) and International

Federations (IFs) as signatories to the code. This was achieved to a large extent by 2004. Richard Pound, Chairman of WADA, has the following message posted on the WADA website (http://www.wada-ama.org)[1]:

"[2004] was the year when the World Anti-Doping Code was implemented by sports organizations prior to the Olympic Games in Athens, Greece. The Code ensures that, for the first time, the rules and regulations governing anti-doping are the same across all sports and that athletes face a level playing field when it comes to doping."

In this paper, we question the assertion that the playing field has been levelled. As far as sanctions for doping are concerned, the uniform adherence to the Code[2] does not imply a level playing field. Regulatory measures will ensure a level playing field if and only if they lower incentives for *doping uniformly* across all athletes, that is, if they satisfy horizontal equity. Imposing *regulations uniformly* that are more likely to reduce doping for one subset of athletes than another implicitly favours the latter and creates an unequal playing field. We argue that current WADA punishment schemes create this bias and violate the principle of horizontal equity. In particular, we highlight the role of risk attitudes, wealth and the earning potential of athletes in their doping decisions. The current anti-doping schemes fail to take these variables into account.

The WADA Code, and the Olympic Movement Anti-Doping Code that preceded it, rely on a system of sanctions imposed on athletes caught for doping. The implementation of these sanctions is undertaken by the relevant NOC or IF. Under the WADA Code, the mandatory sanctions range from warnings to a lifetime ban depending on the nature of the violation[3], the type of prohibited substance or method detected[4], and the number of times the athlete has repeated the offence (WADA (2003)). Traditionally, lump-sum fines (usually up to a maximum of $100,000) have been imposed as a penalty for doping as well. We analyse these two penalty schemes from an economic perspective. An alternative to a lump-sum fine is a 'marginal fine' on

1   Accessed on August 1st, 2005.

2   WADA attempts to harmonize not only the sanctions on doping, but also international testing procedures, which is desirable. We focus entirely on the former. Comment 10.2 of Article 10 in the code recognizes that harmonization across sports may have the difficulty that incomes and career length vary across sports; a two year ban, for example, will have more effect in sports where careers are short. The document does not, however, explicitly recognize the biases that arise from harmonizing the sanctions across athletes within the same sport from different countries, who differ in terms of wealth, attitudes to risk and natural ability. Addressing these issues is the main objective of this paper.

3   A violation of the anti-doping rules occurs when: (i) a prohibited substance is found during the drug test; (ii) the athlete refuses or fails to provide a sample for the drug test; (iii) the athlete is not available for out-of-competition tests; (iv) the athlete tampers with the sample; (v) trafficking or administration occurs (Article 2, WADA (2003)).

doping, where the amount of the fine is directly proportional to the quantity of dope that is detected. In the model we set up, comparing this hypothetical policy of a marginal fine to the prevalent policies of bans and lump-sum fines helps to highlight the biases involved with current practices. We bring these issues together and analyse the implications of three different sanction schemes (a ban, a lump-sum fine and a marginal fine) on the behaviour of athletes who have different risk attitudes, wealth and earning capacities from activities related to sport.

Our analysis establishes that the current policy measures comprising bans and lump-sum fines do not lower incentives to dope among athletes uniformly, whereas a marginal fine performs this function better. Specifically, we show that when the sanction scheme involves bans and lump-sum fines, risk neutral athletes are more likely to dope than risk averse athletes, while this is not true under a marginal fine scheme. More interestingly, with risk-averse athletes, differences in wealth and natural ability also play an important role in the likelihood of doping: under bans and lump-sum fines wealthier athletes and those with less ability are more likely to dope given a plausible set of circumstances. Again, this bias is eliminated with a marginal fine scheme. The marginal fine scheme, therefore, appears relatively attractive even though, as we establish in Proposition 1, no scheme is able to enforce the zero doping outcome for all possible exogenous probabilities of detection. In spite of attempts to control doping, the problem continues. An interesting cat-and-mouse game has developed over time where regulatory authorities announce a certain set of penalties, and athletes alter the kind of substances and methods they employ for doping in response. Proposition 1 provides insight into why this game is inevitable.

Our analysis departs significantly from previous literature on the economics of doping. It focuses on a single athlete's problem while allowing for the athlete to determine the optimum quantity of drugs. Past analysis (Berentsen (2002), Haugen (2004), for example) has focussed on two-player games in a tournament situation where doping is a binary decision. While this game theoretic framework has certain advantages and has been useful in bringing out the Prisoner's Dilemma nature of the doping problem, it has left many interesting questions unanswered, including the importance of risk attitudes, wealth and earning potential of athletes in the presence of pre-announced sanction schemes[5]. Moreover, the game theoretic framework suggests that doping decisions are based on the opponent in a tournament and would, therefore,

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4 Use of certain performance enhancing substances like anabolic steroids, hormones, etc. and methods like oxygen transfer carry a two year ban for the first offence and a lifetime ban for a second offence. In contrast certain substances, referred to as 'specified substance' that appear in the prohibited list of drugs but which are present in medicinal products, and are therefore likely to be taken unintentionally, receive lower sanctions: a warning or at most a one year ban for the first offence, a two year ban for the second, and a lifetime ban for the third. Examples of such substances are ephedrine, methylephedrine, beta blockers, alcohol, etc. (Articles 2 and 10, WADA (2003); WADA (2005)).

need to be reassessed every time an athlete enters a new contest. This is clearly unrealistic; the decision to dope has a longer perspective, where each athlete must determine whether doping is optimal based on his or her beliefs regarding the expected benefits of doping and its costs[6]. Our analysis attempts to address these issues.

The paper is organized as follows. Section 2 describes the basic model. Section 3 assesses different policy measures to control doping. Section 4 concludes.

2. A model of doping

Consider a situation where an athlete, A_i, faces the following two-fold decision: first of all the athlete must decide whether to use drugs or not; secondly, if A_i does decide to use drugs, the athlete must choose the optimal quantity of drugs. We denote the quantity of drugs that the athlete decides to consume by $q_i \in [0, \overline{q}]$, where the upper bound denotes the safe level of usage beyond which the drugs have serious ill effects for the athlete's health. A_i is endowed with a certain initial wealth, $W_i > 0$, and the athlete's 'earning potential' from sports related activities is parameterized with a variable $\theta_i > 0$. We intend θ_i to capture two abilities of the athlete: the first is the athlete's natural ability in sports; the second, which can perhaps be best described as charisma, is the athlete's ability in generating income from external activities such as sponsorships and endorsements. For instance, a person with average sporting talent, but with the ability to attract endorsements from engaging in sports can still have a high value of θ[7].

Participating in athletic events leads to expected benefits for A_i that depend not only on natural ability, but also on the quantity of drugs consumed. For analytical simplicity, we assume that the expected monetary benefits of doping simply add to those from the athlete's natural abilities, that is, $B_i(\theta_i, q_i) = \theta_i + b_i(q_i)$, where $b_i(0) = 0$, $b_i' > 0$ and $b_i'' < 0$. The expected benefit function $B(.)$ includes both direct earnings of the athlete from tournament prize winnings, as well as indirect, external monetary benefits arising from sponsorships, endorsements and so on. The direct benefit of doping is that it leads to a higher probability of A_i winning tournament prize money. The indirect benefit is that winning tournaments results in increasing the scope for accruing external benefits. Doping, however, also involves costs. These costs are represented by $c_i(q_i)$, where $c_i(0) = 0$, $c_i' > 0$ and $c_i'' > 0$. This cost

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5   Berentsen (2002) does, however, establish that a ranking-based punishment scheme is superior to the IOC sanction scheme.

6   The expected benefits of doping, in this situation, would incorporate an athlete's beliefs over the likelihood that other athletes are doping.

7   As an example, Anna Kournikova's earnings from activities outside the sporting arena outweigh her sporting achievements; yet, her visibility in the tennis court puts her in a unique position to take advantage of these external benefits.

function represents the monetary value of all costs, including potential health costs of taking drugs. It is assumed that $b_i'(0) > c_i'(0)$, so that taking drugs is an attractive proposition for the athlete. If A_i does take drugs, with some exogenous probability $p \in [0,1]$, which is dependent on the existing monitoring technology, the athlete escapes detection by the regulatory authority; in other words, p is the probability of a false negative. For simplicity, it is assumed that the probability of a false positive is zero[8].

Athletes' decisions are based on a pre-announced penalty scheme. We assume that the objective of the regulatory authority is to select a penalty scheme, $f(q, \theta)$, that increases the likelihood of a zero doping response[9]. We consider three alternative penalty schemes. The first is a lump-sum fine (referred to in all that follows as Policy A), where $f(q; \theta) = F, \forall q > 0$. To isolate the effects of the lump-sum fine, it is assumed that the athlete can continue to participate in competitions after the fine is imposed. We contrast this with an alternative fine structure, which imposes a marginal fine based on the quantity of dope discovered (referred to as Policy B), in which case $f(q; \theta) = tq, \forall q$. This is a natural alternative to consider, since, essentially, it involves a marginal 'tax' on doping, as opposed to a lump-sum 'tax'. Given that bans are an integral part of the penalty scheme imposed by regulatory authorities, we investigate the effects of a ban (labelled Policy C) as well. A ban prevents participation, even drug-free, for a certain length of time, and therefore reduces the expected benefits by decreasing the drug-free income from sports related activities of the athlete. Policy C is, therefore, modelled as $f(q; \theta) = \gamma \theta$, where $\gamma \in [0,1]$. In essence, γ parameterizes the length of the ban, and $\gamma = 1$ captures the extreme case corresponding to a life-time ban. As mentioned in the introduction, Policies A and C are employed in reality

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8   Berentsen (2002) investigates the implications of the possibility of a false positive in doping tests Among other things, the possibility of a false positive puts an upper bound on the fines that the regulatory authority can charge. Too high a fine can result in the failure of the participation constraint for drug-free athletes. While this paper does not model it explicitly, a positive probability of a false positive serves as a compelling reason for why regulatory authorities do not, for example, impose unlimited dollar fines.

9   The objectives of the regulatory authority have not been investigated by the literature, which generally assumes zero doping as an objective. While this is not unreasonable, there are other plausible objectives that would in fact encourage doping. For example, the governing authority may be interested in generating exciting competition that raises its revenues due to increased spectator interest. Spectator enthusiasm may be generated, on the one hand, by improved drug enhanced performance that induce new records on a continual basis; on the other hand, doping may enhance the performance of worse athletes so that they can compete effectively against better athletes, which makes the outcome of competition less predictable. Moreover, whether spectators actually care whether athletes take drugs is less than clear. For example, Mark McGwire's androstenedione assisted breaking of a long established home run record in the American Baseball League received much acclaim.

as sanction schemes, whereas Policy B is hypothetical. However, incorporating Policy B in our analysis helps to expose the problems underlying the other two sanction schemes.

Letting $u_i(z)$ denote A_i's utility from an expected outcome z, if the athlete dopes and escapes detection $z = W_i + \theta_i + b_i(q_i) - c_i(q_i)$, while if the athlete dopes and gets caught $z = W_i + \theta_i - f_i(q_i; \theta) - c_i(q_i)$. If the athlete decides not to take any drugs at all, $z = W_i + \theta_i$. The solution to A_i's decision process involves backward induction. The athlete maximizes expected utility (EU_i) contingent on a specific fine structure:

$$\underset{q}{Max}\, EU_i = pu_i(W_i + \theta_i + b_i(q_i) - c_i(q_i)) + (1-p)u_i(W_i + \theta_i - c_i(q_i) - f(q_i; \theta_i))$$

subject to $q_i \geq 0$ (1)

If the solution to program (1) yields a positive amount of drugs q_i^*, then, proceeding backwards, A_i will decide whether to take drugs or not by optimizing:

$$Max\{EU_i(q_i^*; f), u_i(W_i + \theta_i)\}$$ (2)

Here, $EU_i(q_i^*; f)$ is the value function of the expected utility contingent on the fine structure, described in equation (1). The solution to program (1) yields the following Kuhn-Tucker conditions:

$$\frac{u_i'(W_i + \theta_i + b_i(q_i^*) - c_i(q_i^*))}{u_i'(W_i + \theta_i - f(q_i^*; \theta_i) - c_i(q_i^*))} - \frac{(1-p)(f'(q_i^*; \theta_i) + c_i'(q_i^*))}{p(b_i'(q^*) - c_i'(q_i^*))} \leq 0 \text{ if } q_i^* = 0, \quad (3)$$

and,

$$\frac{u_i'(W_i + \theta_i + b_i(q_i^*) - c_i(q_i^*))}{u_i'(W_i + \theta_i - f(q_i^*; \theta_i) - c_i(q_i^*))} = \frac{(1-p)(f'(q_i^*; \theta_i) + c_i'(q_i^*))}{p(b_i'(q_i^*) - c_i'(q_i^*))} \quad \text{if } q_i^* > 0 \quad (4)$$

The notation employed is $u_i' = \dfrac{\partial u_i}{\partial z}$, while all other primed variables represent the derivative with respect to q_i. Condition (4) characterizes the interior solution, and takes the familiar form where, at equilibrium, the marginal rate of substitution between getting detected and not getting detected for doping equals the 'price' ratio weighted by the odds of being detected.

There are two cases in which the athlete may forego doping. The first is described by equation (3). Given the exogenous variables W_I, θ_I, p, the fine structure, as well as the benefits and costs of doping, A_I's optimal decision is characterized by a boundary condition where $q_I^* = 0$. *Ceteris paribus*, this will indeed occur if the probability of escaping detection is very low. The second case is provided by equations (2) and (4), where the athlete finds it optimal to have a positive amount of dope, but the expected utility from doping is lower than that achieved by not doping.

To characterize the boundary condition (3) further, suppose that it is optimal for A_I to set $q_I^* = 0$. Then, equation (3) reduces to:

$$\frac{u_i'(W_I + \theta_I)}{u_i'(W_I + \theta_I - f(0;\theta_I))} \leq \frac{(1-p)(f'(0;\theta_I) + c_i'(0))}{p(b_i'(0) - c_i'(0))} \tag{5}$$

Let $\hat{p}$ denote the threshold probability (switching point) level for a false positive in the doping test such that condition (5) holds with equality. It is evident that for any $p < \hat{p}$, (5) holds with strict inequality, and the optimal solution will still satisfy $q_I^* = 0$. For any $p > \hat{p}$, a local maximum at $q_I^* = 0$ cannot exist, and any solution to the problem must be interior. The threshold probability is, therefore, characterized by[10]:

$$\hat{p} = \frac{f'(0;\theta_I) + c_i'(0)}{\frac{u_i'(W_I + \theta_I)}{u_i'(W_I + \theta_I - f(0;\theta_I))}[b_i'(0) - c_i'(0)] + [f'(0) + c_i'(0)]} \tag{6}$$

Simplifying (6) for the three policies,

For Policy A, $\hat{p}^A = \dfrac{c_i'(0)}{\dfrac{u_i'(W_I + \theta_I)}{u_i'(W_I + \theta_I - F)}[b_i'(0) - c_i'(0)] + c_i'(0)}$ (7a)

For *Policy B*, $\hat{p}^B = \dfrac{c_i'(0) + t}{b_i'(0) + t}$ (7b)

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10 It is not difficult to establish an ordering over the threshold probabilities for the three policies. For example, if the athlete is risk neutral, it is easily verified that $\hat{p}^B > \hat{p}^A = \hat{p}^C$. While comparing Policy B with the other two, however, this ordering is meaningless. The subsequent analysis shows why.

For *Policy C*, $\hat{p}^C = \dfrac{c_i'(0)}{\dfrac{u_i'(W_i + \theta_i)}{u_i'(W_i + (1-\gamma)\theta_i)}[b_i'(0) - c_i'(0)] + c_i'(0)}$ (7c)

Even if the solution is an interior one characterized by equation (4), the athlete may still forego doping if the expected utility from not-doping exceeds the expected utility from taking drugs. In what follows, we will denote the exogenous probability level that equates $EU_i(q_i^*; f)$ to $u(W_i + \theta_i)$ as $\tilde{p}$. Assuming for the moment that A_i is risk averse, Figure 1 below describes the methodology for the case of *Policy A*. For a given $F = F^i$, the curve $EU_i(q_i^*; F^1)$ traces the value function for the expected utility conditional on doping as p changes. For $p \in [0, \hat{p}^{A1}]$, the athlete optimizes by setting $q_i^* = 0$. The *EU* in this range is linear in p, as shown in Figure 1. For any $p > \hat{p}^{A1}$, the optimal amount of doping is positive, but A_i will dope only if the expected utility from doing so exceeds the expected utility from not doping, as given by condition (2). If we let $\tilde{p}^{A1}$ denote the probability level such that $EU_i(q_i^*; F^1) = u_i(W_i + \theta_i)$ in Figure 1, for any $\hat{p}^{A1} < p < \tilde{p}^{A1}$, the athlete receives a higher expected utility by not doping than taking an optimal positive amount of drugs. For $\tilde{p}^{A1} < p < 1$, A_i will dope.
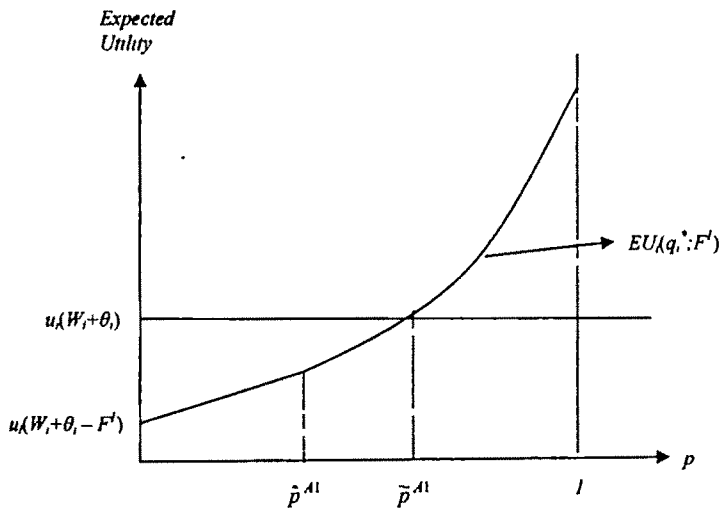

Figure 1 : *Policy A*

Differentiating (8) with respect to F, it is observed that $\dfrac{\partial \hat{p}^A}{\partial F} > 0$; that is, as the fine decreases (increases), the threshold probability $\hat{p}^A$ will decrease (increase). This is shown in Figure 2 for a fine $F = F^2$, where $F^2 < F^1$. The decrease in F results in lowering $\hat{p}^A$ from $\hat{p}^{A1}$ to $\hat{p}^{A2}$. Similarly, the cut-off probability relevant for the decision in equation (2) is also lowered from $\tilde{p}^{A1}$ to $\tilde{p}^{A2}$. Finally, Figure 2 indicates that if the lump-sum fine is eliminated all together[11], the threshold probability is

$$\hat{p}^{A0} = \frac{c_i'(0)}{b_i'(0)}\,,$$ which implies the athlete is likely to consume drugs only if the marginal benefits are high enough relative to the marginal cost. The analysis for *Policy C* follows analogously.
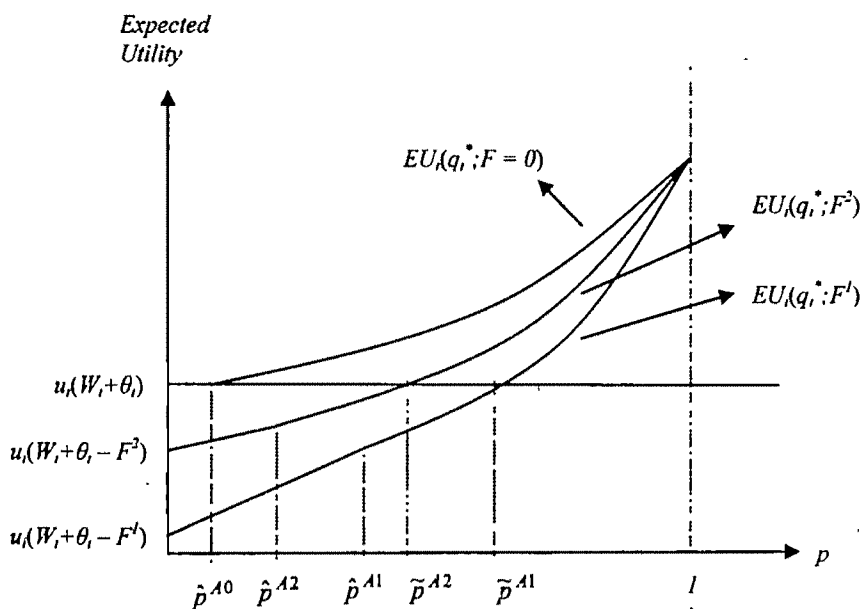

Figure 2: *The effect of changes in fines under Policy A*

Policy B differs from the other two in that *EU* function contingent on the marginal fine overlaps with $u_i(W_i + \theta_i)$ line till the threshold probability $\hat{p}^B$; that is, $\hat{p}^B$ is always equal to $\tilde{p}^B$ for policy B. Changes in the marginal fine rate t would then cause the *EU* line to overlap with $u_i(W_i + \theta_i)$ to a greater or lesser degree.

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11 Note that in this case the only penalty from being caught for doping is that the benefits of doping, *b(q)* are lost. This corresponds to a case where the athlete is fined and then actively monitored to ensure that no further doping occurs.

From a methodological perspective, the fact that $\hat{p}$ and $\tilde{p}$ move together implies that keeping track of the threshold probability $\hat{p}$ serves as a simple way to determine the impact of policy changes on the likelihood that athletes dope.

3. Detection probabilities, policies and athletes' responses

In this section, we analyse the impact of differing risk attitudes of athletes on doping decisions. Often, in order to explore the bias of alternative fine structures, we will compare two athletes A_1 and A_2 who can vary in terms of wealth, natural ability and risk preferences. As a first step, however, it is worthwhile considering whether the regulatory authority can enforce the no-doping outcome for *all* $p \in (0,1)$. Proposition 1 below shows that this is, in fact, impossible, irrespective of whether A_i is risk neutral or risk averse[12]. In other words, there exists a probability $p \in (0,1)$ that, no matter how high the fine is, would induce the athlete to take drugs.

Proposition 1:

For any given $W_i, \theta_i, b_i(.)$ and $c_i(.)$ for an athlete A_i, none of the three policies considered here can enforce the zero doping outcome for all probabilities $p \in (0,1)$.

Proof: See Appendix

Proposition 1 highlights the relationship between the fine structure and the monitoring technology. It establishes that unless the monitoring technology is precise enough *relative to* the fine structure, it may be impossible to enforce the no-doping outcome. This proposition provides some insight into the cat-and-mouse doping game that exists between the regulatory authority and the athletes, where, the regulatory authority announces a penalty scheme as well as a list of prohibited items and substances, and athletes respond to this by adopting a new substance or method with a lower probability of detection. Our model predicts that this is bound to happen, so that athletes constantly attempt to alter the probability of detection.

Consider, for example, Policy A, where the regulatory authority has announced a fine F^1 for substances that have probability p^1 of not being detected. Suppose that $p^1 = \tilde{p}^1$, which implies that A_i is indifferent between doping and not doping under this penalty scheme. For any $p > p^1$, the fine structure will result in doping (see Figure 1). Now, if the athlete has access to a new substance that has a probability of escaping detection greater than p^1, and is *subject to the same penalty* F^1, then the athlete will dope with this new substance[13]. As long as the technology for these new substances to be developed exists, Proposition 1 suggests that this cat-and-mouse game can proceed indefinitely. It also provides the remedy to this problem, that new

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12 Though proposition 1 restricts attention to the three policies treated in this paper, it is straightforward to extend this to any penalty scheme.

13 Certain assumptions are, of course, being made in this simple story. If the cost of obtaining this new substance is higher then the cost function $c(q)$ will have to be modified. Similarly, we have assumed that the new substance has equal efficacy as the old ones, otherwise the benefit function $b(q)$ will have to be modified.

substances possessing performance-enhancing characteristics are subject to an *undisclosed* (potentially very high) sanction. However, there exist practical problems with this remedy related to the feasibility of imposing very high sanctions. Though we have not explicitly considered upper bounds on the fines that can be charged, it is nevertheless certain that such bounds exist. For the case of Policy C, for example, a lifetime ban serves as an upper bound. Similarly, limited liability poses an upper bound for the magnitude of F. Proposition 1 has greater significance in this instance, since the upper bound on a penalty also puts an upper bound on $\tilde{p}$. So athletes may be able to ascertain the maximum penalty, even if undisclosed, that they can be subject to, and then hunt for a drug that satisfies $p > \tilde{p}$. Given the failure of existing policies to cope with the doping problem, some analysts (see, for example, Bird and Wagner (1997)) have proposed alternative methods, such as the maintenance of drug diaries by athletes. Proposition 1 provides theoretical foundations for the need to explore alternative ways to control doping.

Policy B has certain advantages relative to the other two policies, which render it attractive. It is easily shown, for example, that if A_1 is risk neutral, $q_i^{B*} \leq q_i^{A*}$ and $q_i^{B*} \leq q_i^{C*}$ for interior solutions. This is to be expected since the marginal fine adds directly to the costs involved with doping. Proposition 2 highlights an added advantage of Policy B.

Proposition 2: Consider two athletes who are identical in all aspects except their attitudes to risk. The only difference between the two athletes is that A_1 is risk neutral while A_2 is risk averse. Then:

(a) Under policy B, both athletes are equally likely to dope.

(b) Under policies A and C, A_1 is more likely to dope.

Proof: See Appendix

Proposition 2 asserts that the likelihood of doping under Policy B is not sensitive to the risk characteristics of the athletes. Current regulations involving lump-sum fines and bans, on the other hand, create a bias towards greater doping among risk neutral athletes. The past literature on the economics of doping has focussed on situations where athletes are risk neutral. Proposition 2 indicates that the assumption of risk neutrality is not innocuous when addressing policy issues.

While Proposition 2 establishes that risk attitudes are important, Proposition 3 below addresses the issue of how differences in wealth and earning potential affect athletes' doping decisions under different policy regimes. In order to analyse this, we consider a situation where A_1 and A_2 vary in terms of wealth and earning potential, all else being identical between the two. The interesting case, of course, is one where both athletes are risk averse. Consider, first, a situation where A_1 and A_2 are identical in all respects, which implies that the two athletes are equally likely to dope and

$\hat{p}_1^k = \hat{p}_2^k, \forall k \in \{A, B, C\}$. Starting from this situation, Proposition 3 describes the outcome when the wealth or earning potential of one athlete, say A_1, rises.

Proposition 3: Suppose that A_1 and A_2 are risk averse athletes, who are initially identical. If either the wealth or the natural ability of A_1 increases, then:

(a) Under Policy B, the likelihood that A_1 and A_2 dope remains the same as before the increase, and $\hat{p}_1^B = \hat{p}_2^B$.

(b) If the utility function $u(.)$ displays decreasing absolute risk aversion (DARA):

Under both policies A and C an increase in W_1, *ceteris paribus*, will result in a greater likelihood that A_1 dopes, that is $\hat{p}_1 < \hat{p}_2$.

(c) If the utility function $u(.)$ displays decreasing absolute risk aversion (DARA):

Under policy A an increase in θ_1, *ceteris paribus*, will result in a greater likelihood that A_1 dopes, that is $\hat{p}_1 < \hat{p}_2$. Under Policy C, however, an increase in θ_1 will increase the likelihood that A_1 dopes only if γ is small enough.

(d) If the utility function $u(.)$ displays increasing absolute risk aversion (IARA):

Under both policies A and C, an increase in W_1 or θ_1, *ceteris paribus*, will lower the likelihood that A_1 dopes, that is $\hat{p}_1 > \hat{p}_2$.

(e) If the utility function $u(.)$ displays constant absolute risk aversion (CARA):

Under both policies A and C an increase in W_1, *ceteris paribus*, will not alter the relative likelihood of doping, that is $\hat{p}_1 = \hat{p}_2$.

(f) If the utility function $u(.)$ displays constant absolute risk aversion (CARA):

Under policy A, an increase in θ_1, *ceteris paribus*, will not alter the relative likelihood of doping, that is $\hat{p}_1 = \hat{p}_2$. Under Policy C, however, an increase in θ_1 will decrease the likelihood that A_1 dopes, that is, $\hat{p}_1 > \hat{p}_2$.

Proof: See Appendix

The result in Proposition 3 is important because it indicates that the effects of current regulations that involve lump-sum fines and bans are sensitive to wealth and earning potential of athletes. Moreover, WADA has recommended implementation of

these sanctions in all countries. If we can assume that, on average, richer countries have wealthier athletes, the analysis here suggests that under plausible attitudes to risk (decreasing absolute risk aversion), athletes from richer countries are more likely to engage in doping than athletes in poorer countries under these policy regimes. The attempt by WADA to 'level the playing field' by adopting the same sanctions in all sports across all countries fails when the sanctions involve bans and lump-sum fines. A penalty scheme based on marginal fines is more likely to achieve this outcome.

Propositions 2 and 3, together, serve to highlight the fact that lump-sum fines and bans create a bias in some manner or form. Risk neutral athletes are more likely to dope relative to risk averse athletes and under certain circumstances, the bias works in favour of a greater likelihood of doping by wealthier athletes relative to poorer athletes, as well as athletes with high earning potential relative to athletes with low earning potential. Under other circumstances, the bias works in reverse. A marginal fine scheme removes these biases, and in this sense, emerges as a superior policy action.

4. Conclusions

The primary objective in this paper was to provide an analytically tractable model that addresses issues in the economics of doping that have hitherto been ignored: the implication of risk attitudes for the effectiveness of different sanction policies, both real and hypothetical.

Athletes and the regulatory sporting authorities have been involved in a cat-and-mouse game where athletes respond to sanctions based on a prohibited list of methods and substances by using new substances with a lower probability of detection. Sanctions, on the whole, seem to have failed in effectively controlling doping. Our analysis suggests that this is an inevitable outcome of policies based on pre-announced sanctions, and suggest the need to look for alternative ways to control the doping problem, including, as some analysts have proposed, the maintenance of drug diaries by athletes.

Current punishment schemes that involve lump-sum fines and bans invariably create a bias: under a plausible set of circumstances, they are more likely to control doping among poorer athletes with low potential for earnings through sports related activities. Initiatives by institutions such as the World Anti Doping Agency to uniformly enforce these regulations across all countries would implicitly benefit wealthier athletes for whom these regulations have less impact. The analysis in the paper suggests that a marginal fine based on the quantity of drugs detected, by directly adding to the cost of doping, ensures that all athletes have the incentive to use less drugs, irrespective of wealth and earning potential.

Appendix

Proof of Proposition 1:

Consider first the case where A_i is risk neutral. From (7a) and (7c) we have

$\hat{p}^A = \hat{p}^C = \dfrac{c_i'(0)}{b_i'(0)}$, which implies that the regulatory authority has no control over

this threshold probability. Any attempt to control doping must be based on setting $\tilde{p}$

high enough. To make zero-doping the outcome regardless of the technology p , $\tilde{p}$

has to equal 1. Recall that at $\tilde{p}$, $EU_i(q_i^*; f) = u_i(W + \theta_i)$ and $q_i^* > 0$. For *Policy*

A, we have that $\tilde{p}^A = \dfrac{c_i(q_i^*) + F}{b_i(q_i^*) + F}$, and since, for an interior solution we must have

that $b_i(q_i^*) > c_i(q_i^*)$, it follows that $\tilde{p}^A < 1, \forall F$. Similarly, for *Policy C*,

$\tilde{p}^C = \dfrac{c_i(q_i^*) + \gamma \theta_i}{b_i(q_i^*) + \gamma \theta_i} < 1, \forall \gamma$. Thus neither *Policy A* nor *Policy C* can achieve the zero-

doping outcome for all p .

As mentioned in the text, for Policy B, $\hat{p}^B = \tilde{p}^B = \dfrac{c_i'(0) + t}{b_i'(0) + t}$. Since

$b_i'(0) > c_i'(0)$, we have that $\hat{p}^B < 1, \forall t$, and Policy B cannot achieve the zero-doping

outcome for all p .

Now suppose A_i is risk averse. The threshold probability for Policy B remains
unchanged, so the previous result holds for the case of risk averse athletes as well.
For Policy *A*:

$\tilde{p}^A = \dfrac{u_i(W_i + \theta_i) - u_i(W_i + \theta_i - c_i(q_i^*) - F)}{u_i(W_i + \theta_i + b_i(q_i^*) - c_i(q_i^*)) - u_i(W_i + \theta_i - c_i(q_i^*) - F)}$, which is less

than 1 for an interior solution. The analysis for Policy *C* is similar.   Q.E.D.

Proof of Proposition 2:

(a) The fact that the two athletes are identical except in terms of the risk attitudes
implies that we can drop the sub-scripts indexing an athlete for all variables except
the utility function. From (7a) it is evident that:

$$\hat{p}_1^B = \hat{p}_2^B = \frac{c'(0)+t}{b'(0)+t}$$

That is, under Policy B, both athletes are equally likely to dope.

(b) Under Policies A and C, A_1 has a threshold probability:

$$\hat{p}_1^A = \hat{p}_1^C = \frac{c'(0)}{b'(0)}$$

For A_2, however, the threshold probabilities are:

$$\hat{p}_2^A = \frac{c'(0)}{\dfrac{u_2'(W+\theta)}{u_2'(W+\theta-F)}[b'(0)-c'(0)]+c'(0)} \text{ and}$$

$$\hat{p}_2^C = \frac{c'(0)}{\dfrac{u_2'(W+\theta)}{u_2'(W+(1-\gamma)\theta)}[b'(0)-c'(0)]+c'(0)}$$

Since $u_2'' < 0$, it follows that $\hat{p}_1^A < \hat{p}_2^A$ and $\hat{p}_1^C < \hat{p}_2^C$.   Q.E.D.

Proof of Proposition 3:

(a) This follows directly from (7b).

(b) Suppose A_1 and A_2 are identical in all respects except their wealth and natural abilities. Consider Policy A first; $\hat{p}_1 \le \hat{p}_2$ iff:

$$\frac{u'(W_2+\theta_2)}{u'(W_2+\theta_2-F)} \le \frac{u'(W_1+\theta_1)}{u'(W_1+\theta_1-F)}$$

If, initially, $W_1 = W_2 = \overline{W}$ and $\theta_1 = \theta_2 = \overline{\theta}$, then $\hat{p}_1 = \hat{p}_2$. Starting from this situation, suppose W_1 were to increase. Let $z(W_1,\theta_1) = \dfrac{u'(W_1+\theta_1)}{u'(W_1+\theta_1-F)}$.

Differentiating with respect to W_1:

$$\frac{\partial z}{\partial W_1} = \frac{u''(W_1+\theta_1)u'(W_1+\theta_1-F) - u''(W_1+\theta_1-F)u'(W_1+\theta_1)}{(u'(W_1+\theta_1-F))^2}$$

If the utility function exhibits DARA:

$$\frac{-u''(W_1 + \theta_1 - F)}{u'(W_1 + \theta_1 - F)} > \frac{-u''(W_1 + \theta_1)}{u'(W_1 + +\theta_1)}$$

$$\Rightarrow \frac{\partial z(W_1, \theta_1)}{\partial W_1} > 0$$

We therefore have that startin+ om a situation where $W_1 = W_2 = \overline{W}$, an increase in A_1's wealth leads to:

$$\frac{u'(\overline{W} + \overline{\theta})}{u'(\overline{W} + \overline{\theta} - F)} < \frac{u'(W_1 + \overline{\theta})}{u'(W_1 + \overline{\theta} - F)}$$

$$\Rightarrow \hat{p}_1 < \hat{p}_2$$

For Policy C, the effect of an increase in W_1 results in an identical analysis as Policy A.

(c) For Policy A, we have that $\dfrac{\partial z(W_1, \theta_1)}{\partial \theta_1} > 0$, which implies that an increase in A_1's earning potential also makes A_1 more likely to dope relative to A_2.

For an increase in θ_1 under Policy C, however,

$$\frac{\partial z}{\partial W_1} = \frac{u''(W_1 + \theta_1)u'(W_1 + (1-\gamma)\theta_1) - (1-\gamma)u''(W_1 + (1-\gamma)\theta_1)u'(W_1 + \theta_1)}{(u'(W_1 + \theta_1 - F))^2}$$

With DARA, this is positive only if γ is low enough.

(d) and (e) and (f) The proofs for IARA and CARA are analogous to the proofs for DARA.   Q.E.D.

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Debt Contract and Investment : Theory and Applications to India

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Abstract

This paper focuses on the relationship between outstanding debt and investment under pari passu debt contract, the most common form of debt contract that prevails in India. If a firm defaults pari-passu debt contract gives all debt holders the right to claim the proceeds of the liquidated assets in proportion to their amount of outstanding debt. Under this type of debt contract we found an inverse relationship between the amount of outstanding debt and the amount of investment. The underinvestment incentive under pari-passu debt contract is lower than that of the contract that ranks new debt holders subordinate in terms of repayment. But pari-passu debt contract exhibits higher overinvestment incentive compared to project financing or the contract that ranks new debt holders senior in terms of repayment.

JEL Classification : E22, G00

Keywords : Investment, debt contract, pari-passu contract, outstanding debt.

I. Introduction

The neo- classical theory of investment assumes firms to be value maximizers and tries to explain the investment decision in terms of an infinite horizon value maximizing framework. However, the conventional value maximization framework fails to capture some factors that have considerable impact on firm level investment decisions. One such factor is the existence of long-term debt obligations on firm's balance sheet.

The impact of long term debt on investment was first analyzed by Jensen and Meckling (1976) and Myers (1977). Interestingly, the two papers came up with mutually contradictory results. According to Jensen and Meckling, existence of debt obligations leads firms to take excessive risks and invest in projects even with negative NPV. Myers, on the other hand, argued that a large debt burden on firm's balance sheet discourages new investment. The loss associated with this sub-optimal investment decision is commonly referred as the '*agency costs of debt* '.

Subsequent papers in this particular field reconciled both the over and under investment incentives. Since both over and under investments lead to inefficient

solution, they devoted most of their efforts to deriving ways to get rid of these potential inefficiencies. A vast literature has developed in this particular field.[1] What emerges from this discourse is that both the nature of debt contracts and the chance of debt renegotiation alter investment incentives considerably. Hence, before forecasting the impact of long-term debt on investment it is necessary to know a priori the underlying nature of debt contracts and the scope of renegotiations.

The focus of this paper differs significantly from the earlier analyses. Instead of finding out ways to reach an efficient form of contract, our major target is to find out the over and underinvestment incentives associated with the debt contracts that commonly prevail in the real world. However, paucity of data forced us to concentrate only on the debt contract that prevails in India. We found that in India most of the debt contracts are made on pari-passu basis. The pari-passu debt contract gives all the debt holders the same seniority in terms of repayment in the event of default. Surprisingly, this particular type of debt contract never got its due importance in the literature. Therefore by focusing on pari-pasu debt contracts this paper throws light on some particular aspects of investment which were beyond the scope of existing literature. We found that pari-passu debt contract creates overinvestment incentive for low value projects. But for high value projects this raises the underinvestment incentive. However, a rise in the value of outstanding debt reduces the overinvestment incentive. This clearly predicts a negative relationship between the amount of outstanding debt and the amount of investment. We have also made a comparative study of three alternative forms of debt contract vis-à-vis the pari-passu debt contract in our analysis.

The paper is arranged as follows. In Section II we have made a brief discussion of the nature of debt contract prevailing in India. In Section III we have analysed the consequences of pari-passu debt contract. Section IV compares the over and underinvestment incentives of the alternative forms of debt contract with pari-passu debt contract. Section V concludes the paper.

II. Ex – Ante Debt Contracts In India

Financing investment through long and medium term loans takes an important role in India's corporate sector. This was recognized by Rangarajan (1970) who started to project corporate investment in India entirely on the basis of application for the term loans in all India term lending institutions. This method was used by the Reserve Bank of India (R.B.I) and others in subsequent years and is considered to have relevance in developing countries like India where capital requirements for projects are largely met by the specialized term lending institutions.

The banks and financial institutions provide secured loans for fixed capital. These loans are provided either by mortgaging fixed assets or by hypothecating moveable assets. Since, we are mainly concerned with the investment activity (which implies

expansion of fixed capital) we shall leave the issue of financing working capital and concentrate on the nature of fixed capital finance.

In terms of seniority loans on fixed capital can be two types - **Senior Loans** and **Junior Loans**. A loan is said to be a senior loan if, in the event of bankruptcy, the lender has first claim (defined in the contracts as 'first charge') on the value of the liquidated assets. On the other hand, a junior loan is that loan which has claim only on that part of the liquid assets which is left after meeting the claim of the senior lenders. This is referred in the debt contracts as 'second charge'.

If there are more than one senior loan (as is generally found in India) and the value of liquidated assets are lower than the debt obligations then the senior debt holders share the liquidated assets on a 'pari-passu' basis. This means each gets a part of the liquidated assets in proportion to the value of his loans. In India most of the loans are provided on a **first charge pari-passu** basis. Financial institutions generally hesitate to provide loans on second charge due to the financial risk inherent in these contracts. Only a few high profit oriented firms get the scope of acquiring funds on the basis of second charge.

To provide evidence in favour of the above argument we shall present the loan agreement of two firms with four financial institutions – two commercial banks and two all India development financial institutions. However, as loan agreements are not supposed to be public knowledge, both the firms prefer to remain anonymous. We therefore call them **ABC Ltd** and **XYZ Ltd** respectively. The details of the loan agreements are given in the Appendix.

III. Over And Under Investment Incentives Under Pari Passu Debt Contract

In this section we shall present a two period model of pari - passu debt contract following the framework developed by Berkovitch and Kim (1990) [henceforth BK] to highlight the over and under investment incentives associated with the particular form of debt contract. We consider a two period model. In period 1 a firm has an ongoing project, project x, partly financed by debt with face value F_o. This x can also be treated as the totality of the projects undertaken by the firm up to time 1. Hence F_0 is the face value of all the outstanding debts taken by the firm upto time 1. The firm considers whether to take a new project, project y, or not. This project, if undertaken, will be entirely financed by debt with face value F_1. Suppose, the new debt is 1/m proportion of the value of total debt undertaken by the firm including the new debt itself, i.e., $F_1 = (1/m)(F_0 + F_1)$. Under pari passu debt contract this would imply, in the event of default, the lenders of the new debt will get 1/m proportion of the total proceeds of the firm. The higher the initial degree of indebtedness, the lower is the value of 1/m and consequently the lower is the return to the new holders in the event of default.

In period 2 the gross return of the projects are realized and distributed to the shareholders.

The return in period 2 is uncertain and unknown in period 1. For simplicity we assume two states - high (H) and low (L) depending on which the returns differ. The gross returns in each state are summarized as follows:

States	Probability	Gross Return from Project x	Gross Return from Project y
L	p	X_L	Y
H	(1-p)	X_H	Y+ s

Though BK assumed the possibility of Y and s to be negative, we ignore this possibility and consider both Y and s to be positive. The returns from the projects are assumed to follow the following properties:

$$0 < X_L < F_0 < X_H \tag{P1}$$

$$0 < X_L + Y < F_0 + F_1 < X_H + Y + s \tag{P2}$$

The condition stated above has two implications –(i) the firms have a positive probability of default and (ii) the market value of equity remains positive both before and after undertaking the project. We shall assume that managers work in the interest of shareholders, the market is risk neutral and the time value of money is zero (no discounting).

Depending on the nature of information available, we consider two separate situations - one with symmetric information and the other with asymmetric information.

Symmetric Information:

Under the assumption of symmetric information, the true values of the parameters of project y are revealed to everyone. Under this situation, the value of equity (E_x) and debt (D_x) associated with project x are:

$$E_x = (1-p)(X_H - F_0) \tag{1}$$

$$D_x = p X_L + (1-p) F_0 \tag{2}$$

If project y is undertaken it requires an investment outlay of I_1 Since project y is financed entirely by debt, the market value of debt (D_1) must be equal to the investment outlay, i.e., $D_1 = I_1$. When the firm decides to undertake the new project, the face value of new debt and the market value of equity become:

$$D_1 = p Z + (1-p) F_1 \tag{3}$$

$$E_1 = (1 - p) (X_H + Y + s - F_0 - F_1) \tag{4}$$

$$\text{where } Z = \min [(1/m) (X_L + Y), F_1] \tag{5}$$

Equation (5) represents the limited liability associated with the debt contracts. It states that in the event of default each debt holder will receive only a fixed proportion of the net returns of the firm, less than the amount lent.

Rearranging (4) we get :

$$E_1 = E_x + Y + S + p (Z - Y) \tag{6}$$

$$\text{where } S = (1 - p)s - I \tag{7}$$

Here $Y+S = [Y + (1-p) s - I]$ represents the NPV of the new project. Hence, equation (6) indicates that taking new project affects shareholder's wealth not only by its NPV but also by the additional term $p (Z - Y)$.

To find the over and under investment incentives associated with pari-passu debt contracts we consider, as a benchmark, the case of a firm without any debt overhang. The firm undertakes a project only if its NPV, i.e., $Y+S$ is positive. The firm will be indifferent between investing and not investing when $Y+S = 0$. This is represented in Figure 1 by the line NPV=0.Any point on the right of the curve indicates projects with positive NPV and hence is undertaken by the firm. On the other hand the points on the left of the line represent negative NPV projects. The firm rejects these projects.
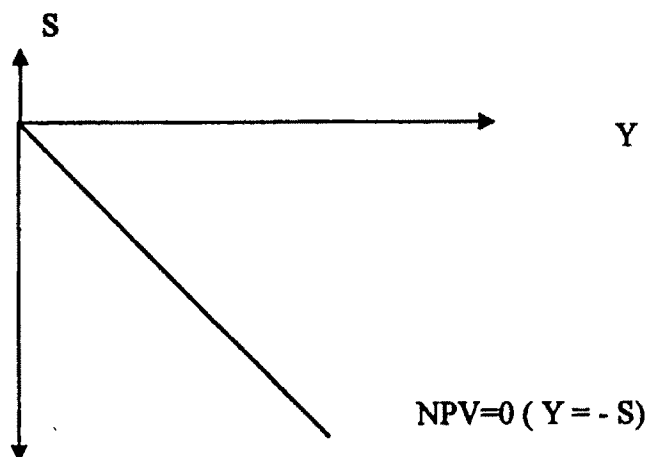

Figure1

For the indebted firm investment is attractive only if it increases the value of the firm i.e., $E_1 \geq E_x$ Putting $E_1 = E_x$ in (6) and substituting the value of Z from (5) we get the following indifference lines:

$$S = -(1-p+1/m)Y - (1/m)p \, X_L \quad \text{for } X_L +Y < mF_I \tag{8.1}$$

$$= -(1-p)Y - pF_I \qquad \text{for } X_L +Y \geq mF_I \tag{8.2}$$

The consequences of pari passu debt contract can be realized by comparing the indifference line derived from (8.1) and (8.2) with the line presenting NPV=0. From the equations it becomes clear that the result depends on the relative values of $1/m$ and p. In fact, there are three possible cases: (a) $1/m<p$; (b)$1/m = p$ and (c) $1/m>p$.

Situation (a) $1/m < p$:

When $1/m < p$, the indifference line before $Y= mF_I - X_L$ is flatter than the line representing NPV=0. However the point of intersection of the two lines depend on the value of m. When the value of m is not very large $[m < (F_I+X_L)/F_I]$, the firm is not so indebted, the indifference line cuts NPV=0 at $Y=F_I$. On the other hand, as m rises above $(F_I+X_L)/ F_I$ both the lines intersect at $Y= [(p/m)/(p-1/m)]$, this is represented in Figure 2.
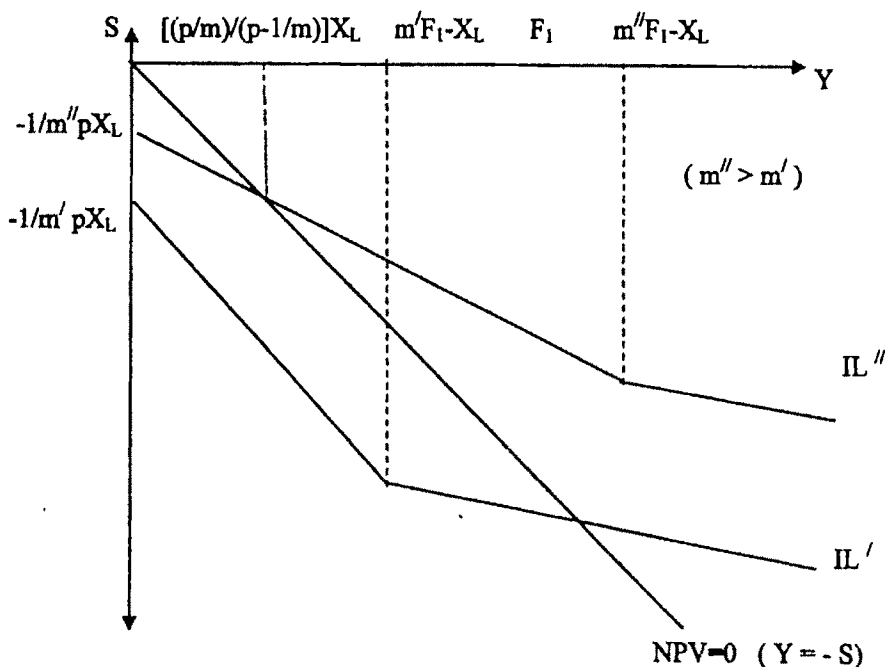

Figure 2

In the figure the indifference lines are drawn under two separate values of m : m' and m'' such that $m' < (F_I+X_L)/F_I$ and $m''> (F_I+X_L)/F_I$. The indifference lines are represented by IL $'$ and IL $''$ respectively. The figure makes it clear that for the indebted firm low values of Y leads to underinvestment equilibrium. However as the value of Y increases, firms tend to overinvest. Comparison of IL $'$ and IL $''$ points out that increase in the value of m decreases the over investment incentive only but at the expense of increase in under investment incentive. This is because increase in m implies a low

value of $(1/m)$ (X_L+Y). This would imply transfer of a larger part of the proceeds from new investment to the existing debt holders. Due to this transfer firms with higher m˙ show higher tendency to under investment.

Situation (b) $1/m = p$:

When $p=1/m$, the indifference lines become parallel to NPV $=0$ till $Y< mF_1- X_L$ and flatter thereafter. The curve intersects NPV$=0$ at Y$=F_1$. This is shown in Figure 3. Though the curve looks similar to that of Figure 2, since $1/m$ is higher the incentive to over investment becomes higher than the previous situation.
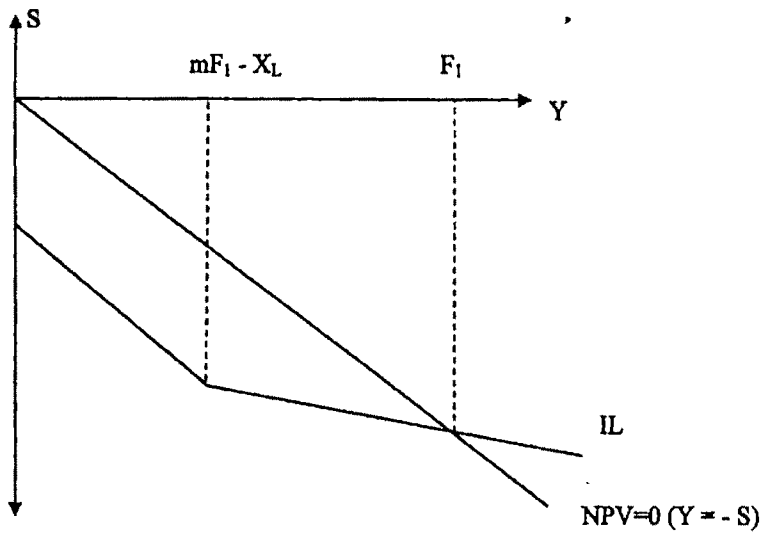

Figure 3

Situation (c) $1/m > p$:

When $1/m$ is greater than p the indifference line becomes steeper than NPV$=0$ before Y$=mF_1- X_L$ and flatter thereafter. Both the lines intersect at Y$=F_1$. Since $1/m$ is highest in this case, the incentive to over invest is also the highest. This is shown in Figure 4. Similar to case 1, the over investment incentive decreases with increase in the amount of outstanding loans.
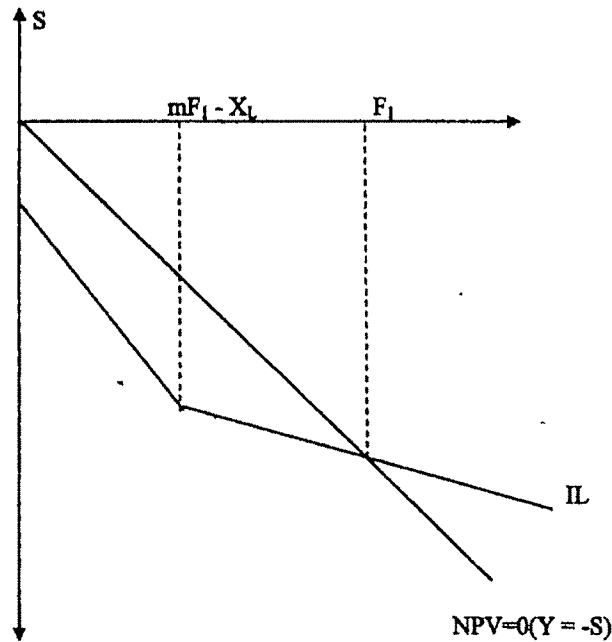
Figure 4

Consideration of the three cases brings out **two important observations**:

1. Comparison between p and 1/m becomes important in determining over and under investment incentives.

2. As 1/m decreases the under investment incentive increases and vise versa.

For the first observation, note that p shows the probability of default while 1/m the proportion of return to be received by the lender in the event of default. Hence, the term (p-1/m) can be interpreted as the net chance of default. Hence, a fall in the value of 1/m raises the net chance of default. This restricts the new investment.

The economic intuition underlying the second observation is that, when 1/m is low, most of the returns of the firm are transferred to the old debt holders in the event of default. This transfer of resources acts as the crux of the under investment incentive. Hence reduction in the value of 1/m reduces the urge for further investment.

Situation 2 : Asymmetric Information

Under asymmetric information only the stockholders discover the true values of Y and s at period 1. The lender only have the information that Y and s follow a joint cumulative distribution function F(Y, s). However the assumptions (A1) and (A2) hold. Under this situation there exists only a pooling equilibrium in the debt market at time 1. As there is no mechanism to separate high quality firm from low quality firm, the lender prices new debt based on the average quality of the new projects. Following BK we replace Z by μ_z which under pari-passu debt contract, takes the form

$$\mu_z = E[\min\{ (1/m)(X_L + Y), F_1\}] \tag{9}$$

Under pari passu debt contract equation (1) through (4) and (6) are still valid if Z is replaced by μ_z Replacing Z by μ_z in (6) and setting $E_1 = E_x$ we get

$$S = -(1-p)Y - p\,\mu_z \tag{10}$$

By definition μ_z is strictly positive. Thus the indifference line (10) has a negative intercept. This is represented in Figure 5 by the two lines $E_1^* = Ex$, each representing a particular value of m.

The consequences of information asymmetry is similar to that stated by BK. Information asymmetry helps the low quality firms (i.e., firms with low value of Y) get access to funds which was otherwise not possible. As a result these firms are more willing to undertake projects under asymmetric information than under symmetric information. Similarly for the high quality firms (i.e., firms with high value of Y), the cost of borrowing is higher than under symmetric information . As a result, their under investment incentive is greater. The additional information derived from our framework is that – the more the degree of indebtedness the lower is the value of μ_z (due to lower return in bad state). This shifts the indifference line upwards. Clearly, increase in the amount of outstanding debt raises the under investment incentive.
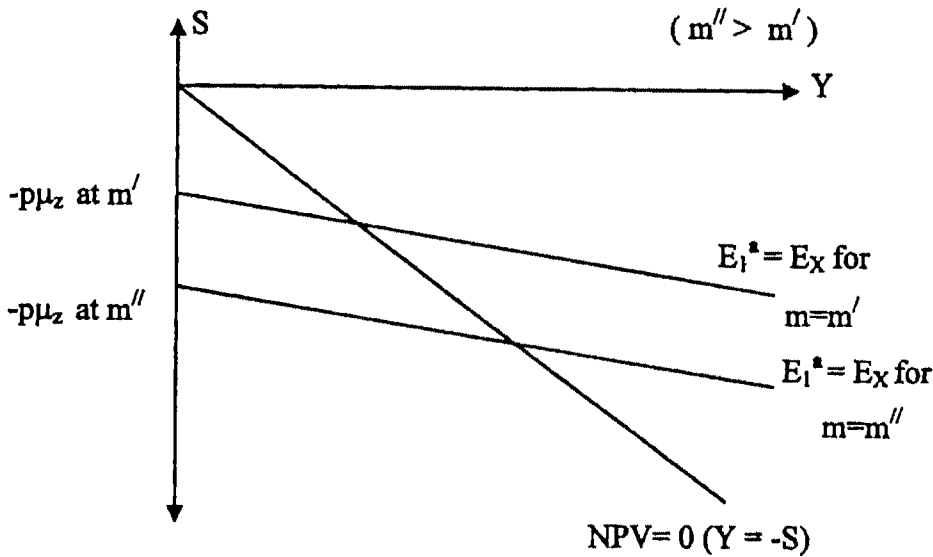

Figure 5

IV. Comparison With Other Type Of Debt Contracts

To compare the over and underinvestment incentives of pari-passu debt contract with other type of debt contracts we shall consider the case of perfect information only. We shall consider three other forms of contract.

Case1: Old debts are strictly senior to new debts:

When old debts are strictly senior to new debts Z transforms to

$$Z = \max \{X_L + Y - F_0, 0\} \tag{11}$$

Rearranging (4) and equating $E_i = Ex$ we get the indifference lines as :

$$S \;\; = \; -(1-p) Y \qquad \text{if } Y \le F_0 - X_L \tag{12.1}$$

$$= -Y + p\, (F_0 - X_L) \qquad \text{if } Y > F_0 - X_L \tag{12.2}$$

To compare the underinvestment problem under pari passu debt contract with that of strict subordination we present Figure 6 where $E_i = E_x$ represents the indifference line under strict subordination while IL' and IL'' represent indifference lines under pari passu contracts. We find, for low values of Y, the under investment incentive under pari passu debt contract is generally lower than in the case of strict subordination. However, as the amount of outstanding debt increases (1/m decreases), the pari passu debt contract appears to be as risky as subordinated debts. As a result both the lines tend to coincide.
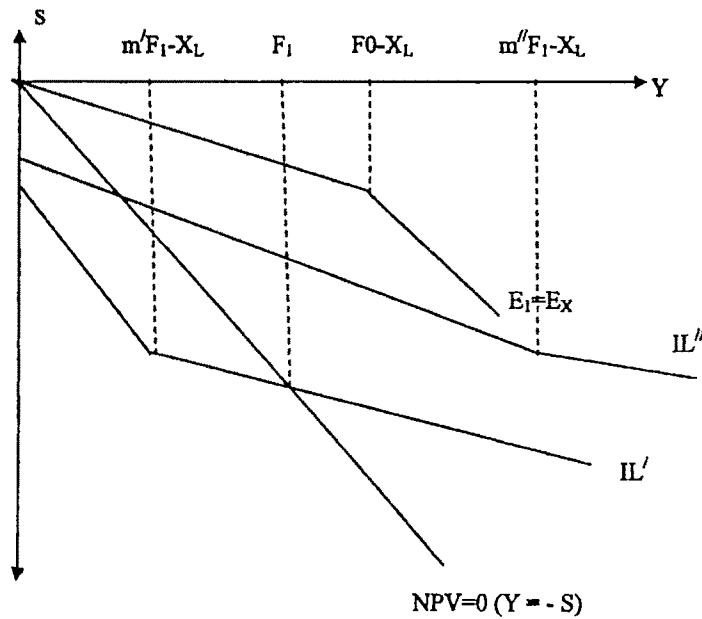

Figure 6

Case 2: New debts are strictly senior to old debts:

When new debts are strictly senior to old debts, Z transforms to

$$Z = \min [\ X_L +Y, F_1 \ ] \tag{13}$$

Hence the indifference lines become:

$$S = - (1\text{-}p) \, Y - pF_1 \qquad \text{if } X_L +Y \geq F_1 \tag{14.1}$$

$$= - Y - p \, X_L \qquad \text{if } X_L +Y < F_1 \tag{14.2}$$

The indifference line under this assumption is shown in Figure 7a and 7b by the lines $E^F_1 = E_x$. To compare the over and under investment incentives of this type of contracts with the pari-passu debt contract we find three possibilities. When $1/m > p$ the initial slope of the indifference line with pari-passu debt contract is steeper than that of the contract, which gives new debt strict seniority. As a result though the initial over investment incentive is higher than pari-passu debt contract, it becomes lower as Y exceeds a certain level. This is shown in Figure7a. However when $1/m = p$ the initial slope of the indifference line is similar in both the cases. Due to the fact that the absolute value of the intercept term is lower under pari-passu debt contract, seniority to the new debt raises the overinvestment incentive. The over investment incentive under such type of contract is also high when $1/m < p$. These two features are shown in Figure 7b.
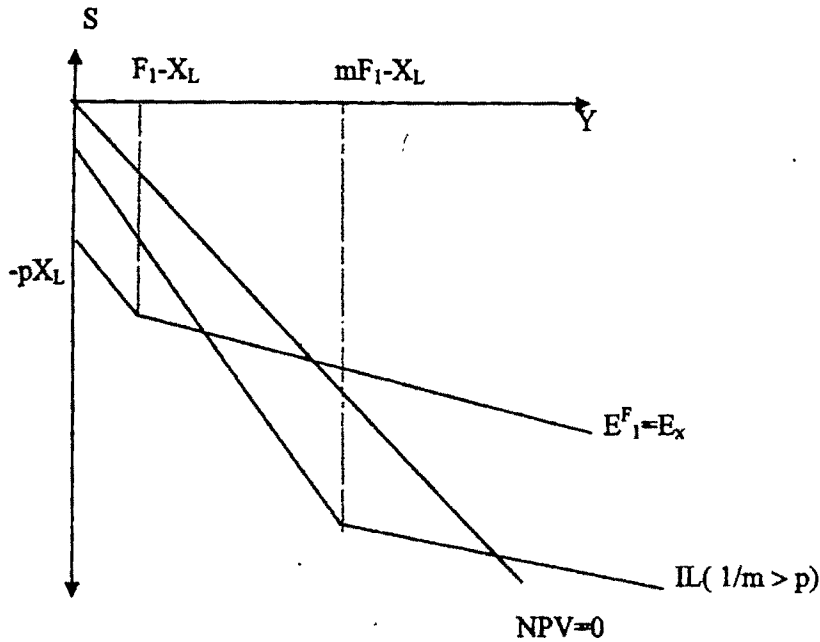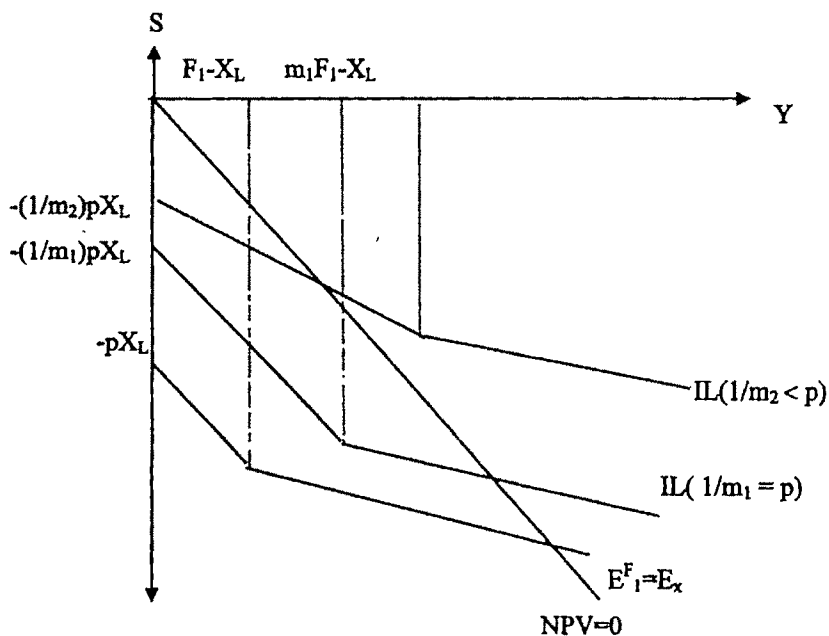

Figure 7a

Figure 7b

Case3 : Project financing :

Under project financing $Z = \min [Y, F_1]$. Therefore the indifference line becomes

$$S_1 = -(1-p)Y - pF_1 \qquad \text{when } Y > F_1 \tag{15.1}$$

$$= -Y \qquad\qquad \text{when } Y < F_1 \tag{15.2}$$

The relevant indifference line is shown in Figure 8 by $E^P_1 = E_x$. Note from Figure 8 that project financing does not lead to over investment. Since pari passu debt contract always contains some amount of overinvestment incentive, we can therefore definitely say that the incentive to overinvest is greater in pari passu debt contract.
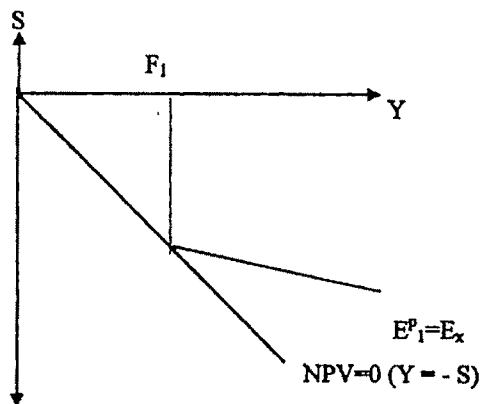

Figure 8

V. Conclusion

Investment or disinvestment decision of firms depends on a number of factors. The amount of outstanding debt and the nature of the debt contract are two of them. The major focus of this paper was to highlight the debt – investment relationship on the basis of pari-passu debt contract, the most common form of debt contract prevailing in India. Findings suggest that there are both over and under investment incentives associated with pari passu debt contract. When the return from the new project is small firms tend to overinvest. However firms with high value projects tend to underinvest. We also found that under pari passu debt contract there is an inverse relationship between the amount of outstanding loans and the amount of investment. Comparing with other forms of debt contract we found that the underinvestment incentive of pari-passu debt contract is lower than that of the contract that ranks new debt subordinate to the old debts. But when the new debts are given strict seniority, the tendency to overinvest exceeds that of the pari-passu debt contract. However the overinvestment propensity of pari-passu debt contract appears to be greater than that of project financing..

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<u>Appendix</u>

Term Loan Agreements:

Company 1

Name of the Company: ABC Limited

(A)   **Lender :**   EXIM Bank

       Date of lending :   3rd October 2001

Major terms of contract :

a) The borrower hypothecated its moveable fixed assets both present and future

b) This hypothecation has been made with reference to the repayment of loan, payment of interest there on, compound interest, additional interest by way of liquidation damages (in case of default), service fee, cost(legal) charges, expenses, and all other payments becoming due provided that the charge hereby created by the borrower in favour of EXIM Bank shall rank in order of priority as set in schedule IV.

c) For security for the loan and also for the payment of interest and any other charges, costs and expenses payable to or incurred by the bank in relation thereto the borrower agrees to create a **pari-passu first mortgage and charge** of all the borrowers immovable and movable fixed assets, both present and future.

(B) **Lender :**   ICICI Ltd.

Date of lending :   6th June 2001.

Major terms of contract :

a) The facility together with all interest, liquidated damages, front and fee, repayment costs, charges and expenses and other monies whatsoever stipulated in or payable under the facility agreement shall be secured by a first mortgage/ charge in favour of ICICI on all the company's assets including all movable and immovable properties (save and except the specific equipment charged/ to be charged by IDBI, EXIM Bank, SBI for their existing financial assistance) both present and future.

b) The mortgage/ charges in favour of ICICI shall be created in form and manner satisfactory to ICICI and shall

i)   be subject to prior charges created/ to be created in favour of the company's bankers on the company's stock of raw materials, semi-finished and finished goods, consumable stores book debts and such other movables as may be agreed to by ICICI

for securing the borrowings for working capital requirements in the ordinary course of business.

 ii) **rank pari-passu** with charges created / to be created in favour of :

ICICI for its rupee loan of Rs 200 million etc.

 Name of the Company : XYZ Limited

 (A) **Name of the lender:** The Industrial Finance Corporation of India Limited.

 Date of borrowing: 2nd September 1998

 Major Terms of Contract:

 1. Security for the Loans

 The loans together with all interest, liquidated damages, premia on prepayment on redemption, costs, expenses and other monies whatsoever stipulated in this Agreement shall be secured by -

 [a] **a first mortgage and charge** in favour of the lender in a form satisfactory to the lender of all the borrowers immovable properties both present and future; and

 [b] **a first charge** by way of hypothecation in favour of the lender of all the borrowers moveable [save and except book debt] including moveable machinery, machinery spares, tools and accessories, present and future, subject to prior charges created and/or to be created:

 (i) in favour of the borrower's bankers on the borrower's stock of raw materials, semi finished and finished goods, consumable stores and such other movables as may be agreed to by the lender for securing the borrowings for working capital requirements in the ordinary course of business.

 The mortgage and charge referred to above shall **rank pari-passu** with the mortgages and charges and/ or to be created in favour of

 Industrial Development Bank of India of its-

 (B) **Name of the Lender :**   Canara Bank

  Date of Borrowing : 1st February 1992

 Major terms of contract:

 1. For security of the loan and also for payment of interest and any other changes, costs (including those between attorney and client) and express payable to or incurred by the Bank in relation thereto, the Borrower hereby agrees to create charge over both

moveable and immovable properties, both past and present subject to charge on specified properties securing working capital finance.

2. In the event of default by the Borrower, the Bank may

(i) apply and/ or appropriate and / or set off any credit balance standing upon any account of the borrower with any branch of the Bank in India or abroad in whatever currency first in or towards satisfaction of any sum (whether principal, interest or otherwise) due to the bank from the Borrower here under and;

(ii) In the name of the borrower as the Attorney of the Borrower do all such acts and execute all such documents as the Bank may consider necessary or expedient in this regard;

3. Notwithstanding what is stated here in above, it is clearly understood that all the rights of the bank under this agreement are subject to **pari-passu rights** of other lenders to the project.

Ecology to Economics -
A Journey through East Calcutta Wetlands

Ecology and Traditional Wetland Practice -

Lessons from Wastewater Utilisation in the East Calcutta Wetlands -

Dhrubajyoti Ghosh, Worldview, Kolkata,

Rs.500.00

Wetland is a rather new term even for the environmental discourse. The textbook of ecology as late published as in 1984 did not mention the term wetland (Koromondy,1984). Previously it would be mentioned as marsh, swamp, bog, fen etc. [There are only 4 references out of about 711 references where the term wetland has been used before 1971 in the major text on wetland *'Wetland'* by Mitsch & Goschlink (1986)]. In Bengali language (the language spoken around East Calcutta Wetlands) there was no term equivalent to wetland and now the oft-used *term jalabhumi* seems to be a direct translation of the word 'wetland'. It seems that the term came into wider use after 'The Convention of Wetlands of International Importance Especially as Waterfowl Habitat' held at Ramsar in Iran in 1971.The understanding of wetland was initially limited to the significance of some specific issue like waterfowls but subsequently the scope quickly widened to as vast as the wetlands are in the world. There are different definitions but probably Asian Wetland Bureau (now Wetlands International-Malaysia Office) in 1991 had offered the most flexible definition, extending it to include all natural types of wetlands and 'man managed systems such as rice fields, fish ponds and reservoirs". This has also widened the space for study of different aspects of wetlands - from its ecology to its economics. Dhrubajyoti Ghosh who has been studying in details the East Calcutta Wetlands *(ECW)* for more than two decades, is accepted as one of the pioneers in this area. He was the moving spirit behind the foundation of Institute for Wetland Studies and Ecological Design, the first such institute in India on wetland. He was also one of the recipients of UN Global 500 laureate award for his work on *ECW.* The book under discussion presents his rich experience in this field. In the introduction he asserts that *ECW* has lessons for urban planners, sanitary engineers, wetland experts, economists, environmental experts and ecologists. The book has attempted to touch on all these aspects in "layman's language".

This book is divided into seven chapters. After a brief introduction the reader gets acquainted with the different types of wetlands and their uses. Wetland use has mostly been evaluated from anthropocentric approaches though its ecological values are no less significant, locally and globally. For eastern India, mangrove wetlands act as buffers against cyclonic sea storms. Ghosh then discusses the management issues of wetlands and reminds the readers that in India wetlands are being sustainably used

by different wetland communities "from which we have yet a lot to learn". He identifies three primary deficiencies in wetland management - awareness gap, lack of policy and regulatory provisions and lack of institutional support- and feels that "we have a long way to go".

For Ghosh the _ECW_ is not just an example of a specific wise use of wetland. He sees its role in a much broader paradigm and thus links it with two most talked about environmentalists' issues - sustainable development and traditional knowledge. He feels that "the strategic essence of greed-based development has been to remain indifferent to nature" and "when all the avenues of social protests were taken care of with remarkable dexterity, capitalism experienced a rude shock from what has been termed here as the _rebellion of nature_". To manage this new situation "the rich. ..have comprehensively incorporated the concern for nature into their mainstream development strategies". To Ghosh therefore "Sustainable development has become a theme of the establishment. Environmentalism, as well as ecology, has ceased to be subversive science any more". But that does not mean Ghosh throws the baby with the bathwater. He calls for a change of "greed based development" and defines sustainable development "as one that respects the thresholds of nature" and "is essentially about living creatively with nature and reducing the assaults of modern consumptive living". He discovers this concept of sustainable development in the wetlands of East Calcutta.

Wetlands of East Calcutta have a long history, as noted by earlier chroniclers. The vast marshy area on the eastern side of Kolkata city has commonly become known to be Salt Lake for quite a long time. Salt Lake near Kolkata has attracted attentions since the foundation of this British trading point. In fact its presence was always considered unhealthy for the town. This was the general perception for most of the marshes, swamps and agriculture or human habitation expanded at the cost of these wetlands throughout the world. These salt-water marshes had been the spill basins of a local tidal river Bidyadhari. Fish culture was widely practiced in these tidal marshes, by building earthen embankments and the fishes were mostly salt-water fishes. However from the last quarter of the 19th century Bidyadhari river was chosen for disposal of the city's sewage and storm water. This and other human interventions along with geophysical changes had made Bidyadhari a dead river by the beginning of the last century. The Salt Lake marshes got slowly converted to sweet water marshes receiving storm water and sewage which changed its ecology too. This also forced the local people to change the past practices and experiment with the use of sewage in fish farming. It started a new phase of developing a traditional knowledge base by recycling urban waste as resource input. The first experiment is reported to be started in 1929 by a local land-owner Bidhubhusan Sarkar (Chattopadhyay, 1990) and this attempt later converted the whole area as sewage-fed fresh water fish culture system. It may be mentioned that a part of this marshy area is also filled with disposing solid waste

for agriculture. The whole area is now more appropriately known as 'Waste Recycling Region' - a region mix of sewage fed pisciculture and waste use agriculture. Ghosh forcefully highlights this aspect of indigenous innovation which created the largest wastewater ecosystem for successive resource recovery.

The use of sewage of Kolkata city for fish farming has come into vogue in the scientific discussion for quite a long time, since mid-forties of the last century (Mukherjee, 2002). S.L.Hora, former Director of Fisheries, pleaded for the *EKW* system in 1944 (Chattopadhyay, 1990). Dr. KC Saha, another Director of Fisheries noted that 'Extensive investigations and researches carried out by the State Fisheries Agency in this important branch of pisciculture have shown that the present rate of indigenous production of fish can be increased at least three-fold if the stocking, exploitation and management are carried out on a scientific basis' (Saha, 1970). However the development of this practice on ground has been more based on the traditional knowledge of the local people who had more in-depth knowledge of the local pisciculture techniques. Thus traditional wetland practice has successfully proved wastes to be real resources. The proper use of sewage, developing the fish eggs into big fish, preparation of the waterbody for fish farming etc., all requires thorough knowledge of the system which has been developed through a community practice and being passed on through generations. Ghosh has described this whole process with some technical data and charts in a very lucid way without diluting the content of his subject. In fact his in-depth understanding of the issue and his assimilation with the fishing community has brought out best of him in these pages. Finally this process also treats the city's sewage without any additional cost for chemicals or energy. This is a kind of win-win scenario in modern management's vocabulary. Ghosh takes this example and links it with a number of other traditional practices like coastal fishing to conservation of rice varieties which have been in tune with the local ecology. Though he also puts a note of caution that all traditional practices may not be good and needs a preliminary scientific enquiry to shortlist the appropriate ones.

Can all these practices be expressed through some economic indicators so that its effect can be judged more quantitatively? Environmental economics, the new branch of the environmental discourse, is trying to provide that service though with mixed success. Wetland valuation is now in practice and Ghosh has given some examples in his book e.g Asian wetlands had the highest economic value at $1.8 billion per year. *ECW* has been valued for its services as sewage treatment plant (STP), as fish feed producer, as supplier of irrigational water, livelihood support and others and the total annual value worked out to be Rs.1773 million. Of this total amount, 15 percent accounts for wages earned by the fishermen and major 73 percent for STP services. The average monthly wage for fisher folk can be computed to be Rs.2500, not an encouraging one. Though it is known that all the environmental and human components

cannot be quantified easily and even the quantifications have large degree of uncertainty. An exercise by USEPA to monetize the economic benefits of Clean Air Act generated a result ranging between 5.6 to 49.6 trillion dollars, depending on the uncertainty factor used (USEPA, 1997).

What is the alternative to the greed-based development? Of course, it is 'the' sustainable development and Ghosh perceives the *ECW* practice as an example of 'sustainable development'. Sustainable development has been defined by WCED (World Commission on Environment and Development) as "development which meets the needs of the present without compromising the ability of future generations to meet their own needs". As mentioned before, Ghosh questions the concept of 'sustainable development' as presented by WCED because the development of rich and poor countries have been treated alike. He provides a number of popular examples of development priorities of the rich such as spending on alcoholic drinks to military spending rather than on third world poverty. For Ghosh sustainable development is "living creatively with nature... therefore is a roadmap that draws heavily from the traditional knowledge system.. .(as) .. .most of our traditional and indigenous practices were based on the wise use of nature and natural resources by the local people".

Some issues need to be discussed in any future discourse. There needs to be some discussion on the economic conditions of the fisher folk and the production relations in this practice. Is this practice of sustainable development improving their economic conditions? Is it improving their quality of life? Is it a forced choice or a wise decision for livelihood? If the answers are negative, then it is sustainable poverty, a commonplace phenomenon in the developing world like low yield agriculture. And though there have been studies on .the contamination of food produces from the sewage borne pollutants (bacterial to heavy metals), the health implications of the fisher folk who get into direct contact with the sewage mixed water needs to be studied by future researchers.

The book with a foreword from Prof M Swaminathan and a number of useful illustrations, is an interesting reading for a wide section of readers who are willing to know about this traditional wetland practice from many angles. The book also can help the trained environmental experts to look around their own neighbourhood to learn different lessons from traditional practices which can make the world more eco-friendly. And of course it will be equally useful to the environment-concerned people for new ideas and debates.

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– Mohit Ray

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